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{ MARCH 2007 }

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TOYOTA
moving forward

Smithsonian features

{ MARCH 2007 · VOLUME 37, NUMBER 12 }

When the long northern winter finally ends, the Finnish capital returns slowly to life. Deathly pale residents, who look as if they have just emerged from confinement in a cellar, roost on the steps of Senate Square.

"HELSINKI WARMING," PAGE 66

THIS PAGE: Helsinki's Senate Square, dominated by the Lutheran Cathedral (right), is one of the city's main tourist attractions and the site of concerts and other cultural festivities. Photograph by Yoray Liberman / Getty Images. **COVER:** After escaping from a Maltese fortress, Caravaggio fled to Sicily (the old quarter of Syracuse on the island of Ortygia). Photograph by Andrea Pistolesi.

40 Rain Forest Rebel

An Amazonian tribal chief receives death threats after introducing a mapmaking project to document his people's history and culture

BY JOSHUA HAMMER / PHOTOGRAPHS BY CLAUDIO EDINGER

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Principled, brilliant and deliberate on the battlefield, George Henry Thomas may be the greatest Civil War general you've never heard of

BY ERNEST B. FURGURSON

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Curators turn to high-tech tools to decipher what may be the most important ancient scientific writings discovered since the Renaissance: the Archimedes Palimpsest

BY MARY K. MILLER

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Long a leader in technology and design, the Finnish capital is fast becoming one of Europe's happening places

BY JONATHAN KANDELL / PHOTOGRAPHS BY YORAY LIBERMAN

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A Florentine photographer puts a unique spin on public spaces, from Lisbon to Paris, in 360-degree panoramas

PHOTOGRAPHS BY ANDREA PISTOLESI

80 On the Trail of Caravaggio

A novelist traces the footsteps of the 16th-century Italian painter turned murderer in search of his greatest works

BY FRANCINE PROSE / PHOTOGRAPHS BY ANDREA PISTOLESI

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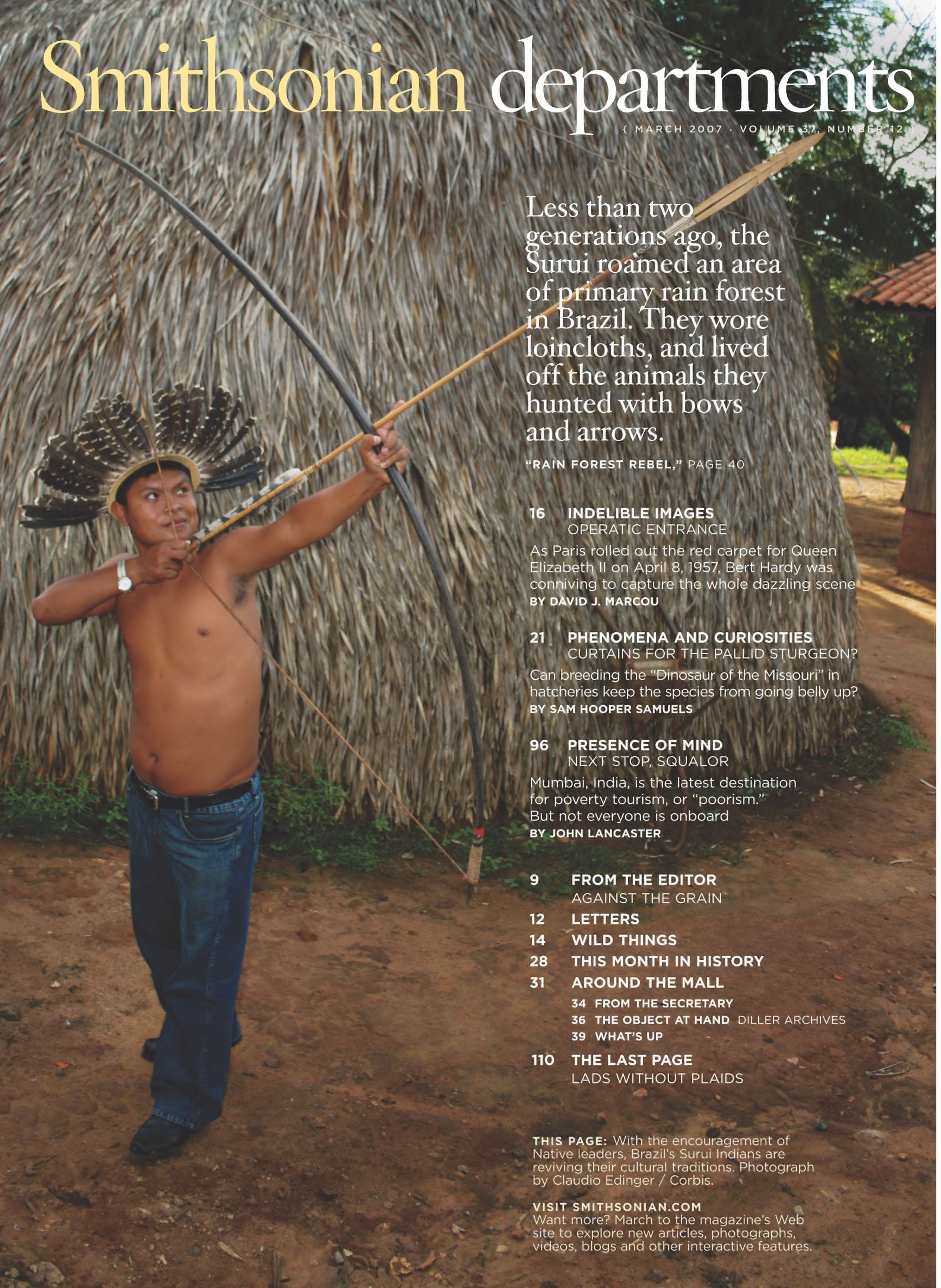

Less than two generations ago, the Surui roamed an area of primary rain forest in Brazil. They wore loincloths, and lived off the animals they hunted with bows and arrows.

"RAIN FOREST REBEL," PAGE 40

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OPERATIC ENTRANCE

As Paris rolled out the red carpet for Queen Elizabeth II on April 8, 1957, Bert Hardy was conniving to capture the whole dazzling scene
BY DAVID J. MARCOU

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Can breeding the "Dinosaur of the Missouri" in hatcheries keep the species from going belly up?
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LADS WITHOUT PLAIDS

THIS PAGE: With the encouragement of Native leaders, Brazil's Surui Indians are reviving their cultural traditions. Photograph by Claudio Edinger / Corbis.

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"Wow."

Microsoft

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FROM THE EDITOR

Against the Grain

Rebels by any name

BY CAREY WINFREY

NOVELIST Francine Prose (*A Changed Man*, *Blue Angel*) says she has loved the work of Baroque master Michelangelo Merisi da Caravaggio "for such a long time that I can't remember ever not knowing about him. He's very direct, and there's nothing ironic about his work at all. I think that's very appealing. When you stand in front of a Caravaggio—or when I do—something happens that doesn't happen anywhere else. It has to do with the intensity of emotion and how beautifully it's painted—the composition and the characters and his insistence on doing things his way."

Prose, who wrote "On the Trail of Caravaggio," p. 80, is not alone. A virtual cult of Caravaggio has lately erupted. Like religious pilgrims, some of its members tour the venues of his tumultuous life in search of . . . what? His genius? His refusal to compromise? His nerve? His darkness?

Prose: "The way a painter describes something in visual language is not that different from what a novelist does."

"His life is incredibly dramatic, and so romantic," says Prose. "Here was a guy who absolutely knew he was right. He was a completely uncontrollable character who was going to do what he was going to do. When my son was in fourth grade, he came home from school one day completely excited because he'd heard Caravaggio had killed somebody over a tennis match. Of course, Caravaggio was very handsome too."

AS SOMEONE BORN IN VIRGINIA, says historian Ernest "Pat" Furgurson, "I've been reading about the Civil War since I was a boy, and identifying with my ancestors who fought on the Confederate side. So the massive fact of George Thomas, a Virginian who fought for the North and became one of the Union's great generals, grew upon me gradually, until I became fascinated with him. Tens of thousands of Southerners fought for the North, but Thomas was the one who was most resented because he was the most successful. What drove him to make the decisions he did? What kind of man was he? What kind of soldier? In his place, would I have done the same thing? The fact that he is such a towering figure, and so few Americans know anything about him, made me want to tell his story." Which Furgurson does, compellingly, in "Reconsidering 'Old Slowtrot,'" p. 50.

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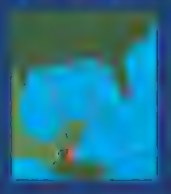

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LETTERS READERS RESPOND TO THE **JANUARY** ISSUE

End of the Road?
Development threatens to block the ancient migration of a herd of pronghorn antelopes in western Wyoming. Without new protections, conservationists say the speedy animals are running out of time
BY DANIEL GLICK
Smithsonian
Basque Country?
Americans in Paris
Polo at 22,000 Feet
The Art of the Mug Shot
Wyoming's Antelope Debate

My very first thought upon viewing the opening page photo of pronghorns crawling under barbed wire was, to paraphrase a former president: Mr. Landowner, take down those fences! "End of the Road?" I sincerely hope not.

MARK D. BLITZER, SEATTLE, WASHINGTON

SAFE PASSAGE

THE BASIC IDEA of our national parks is that their permanent scenic, wildlife and cultural assets outweigh the short-term business profits that could be derived from exploiting the land. Saving the Grand Teton National Park herd of pronghorn antelopes by making an additional commitment of land for a narrow southern migratory corridor would be a minimal sacrifice compared with the 310,000 acres of the park that have already been set aside. Unfortunately, this logic seems beyond the comprehension of the crowd in Washington.

MALCOLM G. BALFOUR
ACME, PENNSYLVANIA

AS A LONGTIME resident of western Wyoming, I looked forward to the article about Wyoming's antelope debate mentioned on the cover of the issue. However, your article was one-sided at best, and did nothing to contribute to a solution. I hope we can find a way to balance the needs of the pronghorns, the people living here and our nation's energy demands. Unfortunately, a National Migration Corridor will only wrestle the last property rights away from the residents of western Wyoming. Remember, we have already had to give over control of our land to wolves and grizzly bears.

FOREST WAKEFIELD
PINEDALE, WYOMING

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SHATTERED PEACE

THE ANSWER to the question posed in Joshua Hammer's "Peace at Last?" is a resounding "not this time." The Basque separatist group ETA's recent bombing of the Madrid airport left hope under a pile of rubble. I hope that Basques and Spaniards may put on their respective berets and flamenco dresses and give each other *dos besos* (two kisses). But this won't happen until the two main parties—the Socialists and the Popular Party—retire their verbal arms and try to understand the oldest and most volatile region of Spain. Together, they can empower the Basque Country to use its democratic voice, while maintaining its culture and eliminating ETA's bombs.

YVETTE SCORSE
ROGERS, ARKANSAS

SIGNATURE SHACKS

"TIME AFTER TIME," on the photographic work of artist William Christenberry, really moved me. In travels around my home state of Florida, I recently began to despair at the loss of the kind of "vernacular architecture" that Christenberry has sought to capture on film. I'm glad to know that I'm not the only one who misses some of those seemingly insignificant buildings that make a place different from everywhere else.

JACK WHITE
CLEARWATER, FLORIDA

FACE VALUE

WHAT A DELIGHTFUL article on mug shots by Katy June-Friesen ("Arresting Faces"). Is this not schadenfreude on a broad scale? Are we peering into these scofflaw faces, thankful they were apprehended and we are not their victims? Is this that anxious, unsettling urge to gaze at the terrible car wreck as we pass by unscathed? Or is it the vicarious pleasure of being a witness to their suffering, laughing and snickering at the misfortunes of others? A base, mean-spirited, but irresistibly addictive behavior? A darkly whispered *vox populi*? Give us more, eh?

M. TUCKER BRAWNER
SAVANNAH, GEORGIA

MY HEART GOES out to the young boy pictured at the bottom right of page 63. He was way too young to have a mug shot published for all the world to see.

BETTY HEINE
CEDAR FALLS, IOWA

BEST TIME

DAVA SOBEL is a wonderful writer, and her article about sundials, "The Shadow Knows," was entertaining and informative. Still, for my money, the best lines about a sundial were written many decades ago by the British poet and essayist Hilaire Belloc:

I am a sundial, and I make a botch
Of what is done far better by a watch.

LOUIS PHILLIPS
NEW YORK, NEW YORK

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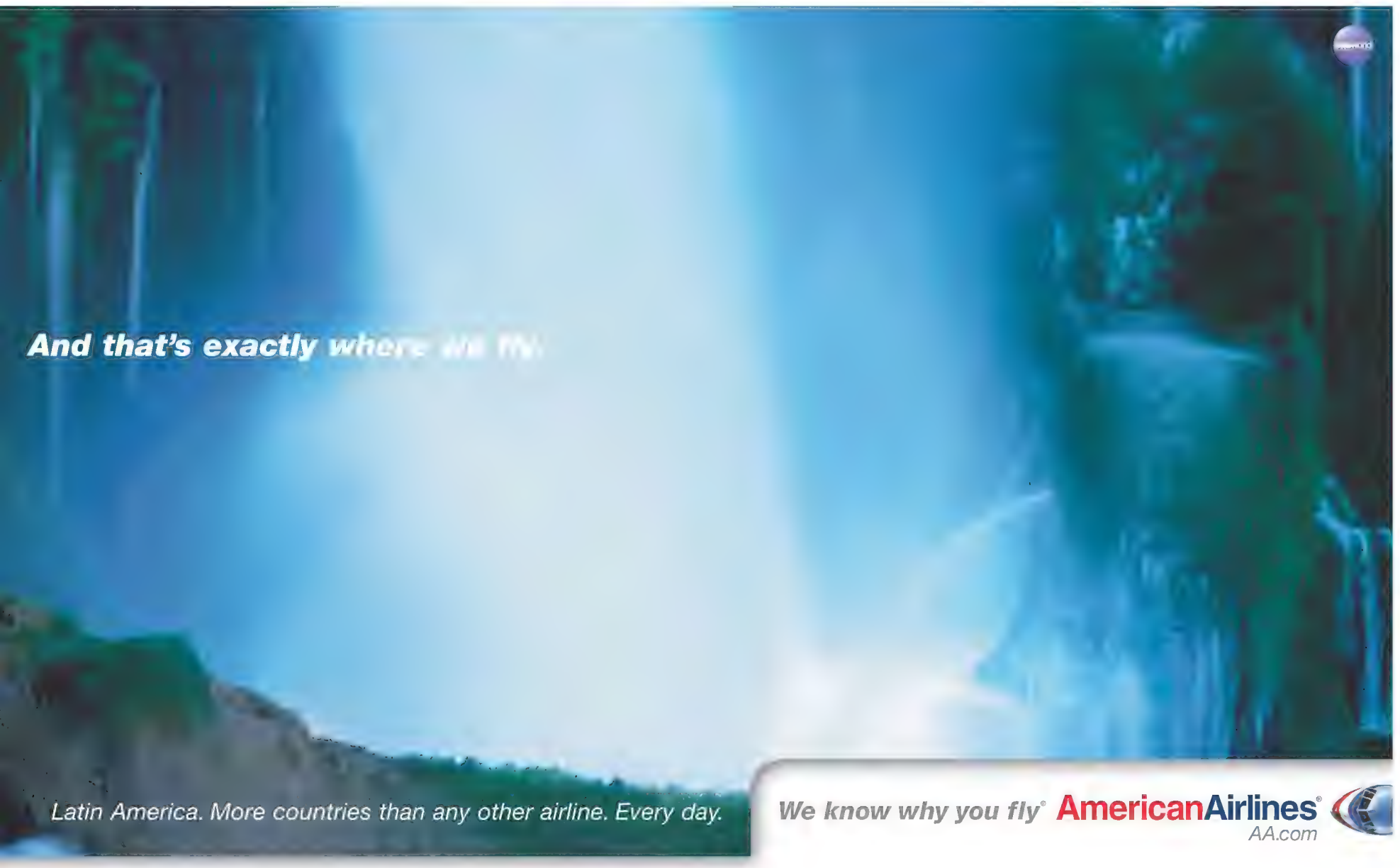
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WILD THINGS

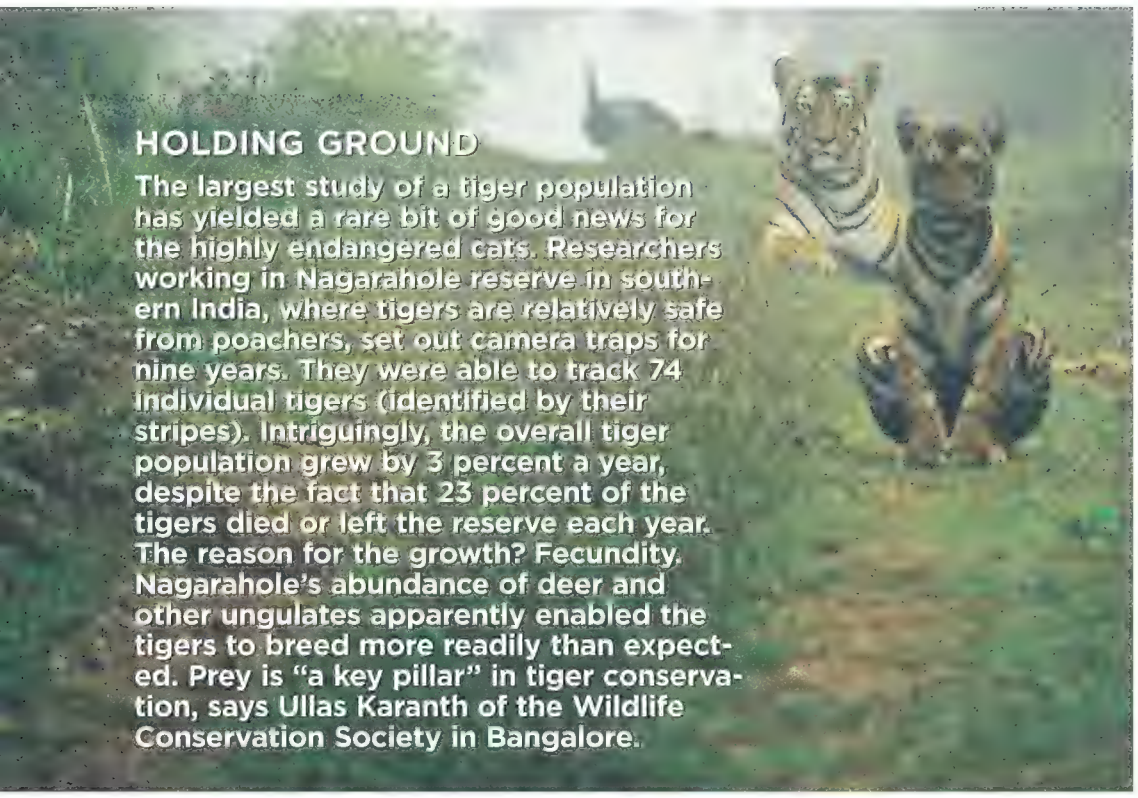
LIFE AS WE KNOW IT

SLOW FOOD

Gray seals have a surprising way to make their air last longer: "deferred food-processing." The marine mammals can stay submerged 20 minutes without coming up for a breath, gulping down as many fish as they can stomach. Most animals start digesting their food as soon as they eat it. But digestion uses oxygen, a precious commodity for an animal holding its breath. Gray seals can put off digestion until after they stop hunting and return to land—sometimes hours later—according to new research from the University of St. Andrews in Scotland. This ability may let seals forage longer and in deeper water.

ORPHAN FLOWER FINDS FAMILY

The world's largest flower, indigenous to Indonesia, has finally found a home on the tree of life. Reeking of rotting flesh, *Rafflesia arnoldii* has no leaves, stems or roots—features typically used to classify plants. But a Harvard-led study that analyzed DNA from the flower and its few relatives now says they belong to the family that includes the poinsettia and rubber tree.



HOLDING GROUND

The largest study of a tiger population has yielded a rare bit of good news for the highly endangered cats. Researchers working in Nagarahole reserve in southern India, where tigers are relatively safe from poachers, set out camera traps for nine years. They were able to track 74 individual tigers (identified by their stripes). Intriguingly, the overall tiger population grew by 3 percent a year, despite the fact that 23 percent of the tigers died or left the reserve each year. The reason for the growth? Fecundity. Nagarahole's abundance of deer and other ungulates apparently enabled the tigers to breed more readily than expected. Prey is "a key pillar" in tiger conservation, says Ullas Karanth of the Wildlife Conservation Society in Bangalore.

GATORS IN THE GYM

Alligators on a treadmill have helped give scientists new insight into how birds fly. The key is a single ligament tying the upper arm to the shoulder joint. In alligators, which are in fact closely related to birds through a common evolutionary ancestor, the ligament isn't prominent, and the reptiles use muscle power to keep their shoulder from dislocating while walking, say researchers at Brown University and Harvard. But in pigeons it's the ligament that holds the shoulder together, freeing up muscle power and enabling the joint to withstand the extreme forces of flight.

NAME: *Condylura cristata*, or the star-nosed mole, a semiaquatic mammal native to eastern North America
HIDDEN TALENT: Sniffing under water
HIDDEN? WITH THAT NOSE? Yes. That "nose" is actually two nostrils surrounded by 22 appendages that are supersensitive to touch.
SO MOLES INHALE WATER? No. Kenneth Catania of Vanderbilt University recently found that, underwater, star-nosed moles exhale air bubbles onto objects and then re-inhale the bubbles. That air carries odorants back through the nostrils, whence they're processed as smells.
ISN'T THAT SPECIAL. Yes, but not unique. Water shrews can smell this way too.

Visit Smithsonian.com for video of sniffing star-nosed moles.

ALAN JAMES / NPL / MINDEN PICTURES; FRANS LANTING / CORBIS; ULLAS KARANTH / WILDLIFE CONSERVATION SOCIETY; DAVID BAIER / BROWN UNIVERSITY; DWIGHT R. KUHN

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Operatic Entrance

As Paris feted Queen Elizabeth II, photographer Bert Hardy found a circumstance to match her pomp

BY DAVID J. MARCOU

THE SUN WAS SETTING on their empires, but neither the British nor the French were going quietly. The two powers, not always the closest of allies, had just tried to thwart Egypt's plans to nationalize the Suez Canal. The two nations were suffering the consequences: tension with the United States, opprobrium in the Arab world, a dawning recognition that the Americans and the Soviets would eclipse them on the global stage.

What better time for a royal visit?

On April 8, Queen Elizabeth II arrived for a three-day sojourn in Paris—the first English queen to visit France since Victoria, in 1855. After a state dinner that evening ("You were the cradle of our kings," she told her hosts, alluding to William the Conqueror's Norman heritage), she swept into the Paris Opera for a performance of the ballet *Le Chevalier et la Demoiselle*.

Photographer Bert Hardy, who had slipped through security, was already shooting, precisely and surreptitiously. Because his 50-millimeter lens could take in only a fraction of the scene before him, he shot 20 frames in all, 15 of which were painstakingly joined, by hand, to compose the image you see here. Diplomatic amity notwithstanding, the British photojournalist was quietly scoring a scoop for his magazine, *Picture Post*, then the *Life* magazine of the United Kingdom.

"*Paris Match* was very much our competition," Hardy told me in 1981. The press pool for the evening was limited to two French and two British media, and *Picture Post* was not on the list. "But the French newsmen were above the rules," he said. "They had 20 [journalists], we would have 2, and the French police were making sure that's all we had."

Hardy hid his Leica under a borrowed and oversize dinner jacket and reported to the opera house. "I wait-

"I saw this fabulous scene," said Hardy. Excluded from the press pool, he had borrowed a dinner jacket and sneaked into the Paris Opera.

Hardy (below, in 1981) shot 20 frames; 15 were later joined. Note that the guards' swords to the queen's left aren't yet raised.

ed till a herd of French dignitaries arrived," he said. "They were terribly courteous, and I went in with them."

Anxious that his brown shoes would stand out amid a sea of formal clothes, he positioned himself with a view of the stairs and started shooting. He could not be haphazard about it: the frames had to overlap just so, because the edges of each one, distorted by his lens, would be discarded during printing, when the frames would be assembled in a montage, or "join-up."

Then Elizabeth entered, escorted by French president René Coty. She wore an emerald-and-diamond tiara and a Hartnell dress encrusted with pearls, topaz and gold. Across its ivory satin lay the French Legion of Honor's bold red sash. When she reached the bottom of the stairs, Hardy had his *pièce de résistance*.

Dispatching his film for developing, he phoned a *Post* staffer to tell her what he had done, and what remained to be done. A diagram illustrating how the frames were joined looks like one of those charts you'd see in a French butcher shop showing where various cuts of meat come from, but the result in *Picture Post*'s special April 20 souvenir edition was spectacular. (About the only clue that the image is a montage is that the guards' swords to Her Majesty's left aren't yet raised.) "I got a double-page spread," Hardy boasted, and "the French didn't get anything."

He came from humble East End origins—his father was a carpenter, his mother a charwoman. Born in 1913, he left school at 14 to process film and largely taught himself how to shoot pictures. He worked for the General Photographic Agency, then for himself, before shooting for *Picture Post*. He also served in the Royal Army Photographic Unit from 1942 to 1946, covering the Normandy invasion, the liberation of Paris, the Allies crossing the Rhine and the suffering of freed concentration camp inmates.

Back with *Picture Post*, Hardy covered the Korean War and U.S. president Dwight D. Eisenhower's 1956 reelection campaign. But whatever joy he took in his success at the Paris Opera was short-lived: in a harbinger of *Life*'s fate, *Picture Post* folded just six weeks after publishing its souvenir edition, a victim of declining circulation. Hardy became one of Britain's best-known commercial photographers before retiring to a Surrey farm in the late 1960s. He died in 1995, at age 82.

After her night at the opera, Elizabeth spent her time in Paris chatting with French veterans at the Arc de Triomphe, laying a wreath at the Tomb of the Unknowns, sailing the Seine at night and generally inciting the French into a Union Jack-waving frenzy. After visiting Versailles and touring around Lille in the north of France, she returned to home and throne. And to her long reign.

DAVID J. MARCOU, *a Wisconsin-based writer, met Bert Hardy as a student in 1981.*

BERT HARDY / PICTURE POST / GETTY IMAGES; DAVID J. MARCOU; PP. 14, 15 BERT HARDY / PICTURE POST / GETTY IMAGES

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Read this information carefully before you start taking VYTORIN. Review this information each time you refill your prescription for VYTORIN as there may be new information. This information does not take the place of talking with your doctor about your medical condition or your treatment. If you have any questions about VYTORIN, ask your doctor. Only your doctor can determine if VYTORIN is right for you.

What is VYTORIN?

VYTORIN is a medicine used to lower levels of total cholesterol, LDL (bad) cholesterol, and fatty substances called triglycerides in the blood. In addition, VYTORIN raises levels of HDL (good) cholesterol. It is used for patients who cannot control their cholesterol levels by diet alone. You should stay on a cholesterol-lowering diet while taking this medicine.

VYTORIN works to reduce your cholesterol in two ways. It reduces the cholesterol absorbed in your digestive tract, as well as the cholesterol your body makes by itself. VYTORIN does not help you lose weight.

Who should not take VYTORIN?

Do not take VYTORIN:

- If you are allergic to ezetimibe or simvastatin, the active ingredients in VYTORIN, or to the inactive ingredients. For a list of inactive ingredients, see the "Inactive ingredients" section at the end of this information sheet.
- If you have active liver disease or repeated blood tests indicating possible liver problems.
- If you are pregnant, or think you may be pregnant, or planning to become pregnant or breast-feeding.

VYTORIN is not recommended for use in children under 10 years of age.

What should I tell my doctor before and while taking VYTORIN?

Tell your doctor right away if you experience unexplained muscle pain, tenderness, or weakness. This is because on rare occasions, muscle problems can be serious, including muscle breakdown resulting in kidney damage.

The risk of muscle breakdown is greater at higher doses of VYTORIN.

The risk of muscle breakdown is greater in patients with kidney problems.

Taking VYTORIN with certain substances can increase the risk of muscle problems. It is particularly important to tell your doctor if you are taking any of the following:

- cyclosporine
- danazol
- antifungal agents (such as itraconazole or ketoconazole)
- fibric acid derivatives (such as gemfibrozil, bezafibrate, or fenofibrate)
- the antibiotics erythromycin, clarithromycin, and telithromycin
- HIV protease inhibitors (such as indinavir, nelfinavir, ritonavir, and saquinavir)
- the antidepressant nefazodone
- amiodarone (a drug used to treat an irregular heartbeat)
- verapamil (a drug used to treat high blood pressure, chest pain associated with heart disease, or other heart conditions)
- large doses (≥1 g/day) of niacin or nicotinic acid
- large quantities of grapefruit juice (>1 quart daily)

It is also important to tell your doctor if you are taking coumarin anticoagulants (drugs that prevent blood clots, such as warfarin).

Tell your doctor about any prescription and nonprescription medicines you are taking or plan to take, including natural or herbal remedies.

Tell your doctor about all your medical conditions including allergies.

Tell your doctor if you:

- drink substantial quantities of alcohol or ever had liver problems. VYTORIN may not be right for you.
- are pregnant or plan to become pregnant. Do not use VYTORIN if you are pregnant, trying to become pregnant or suspect that you are pregnant. If you become pregnant while taking VYTORIN, stop taking it and contact your doctor immediately.
- are breast-feeding. Do not use VYTORIN if you are breast-feeding.

Tell other doctors prescribing a new medication that you are taking VYTORIN.

How should I take VYTORIN?

- Take VYTORIN once a day, in the evening, with or without food.
- Try to take VYTORIN as prescribed. If you miss a dose, do not take an extra dose. Just resume your usual schedule.
- Continue to follow a cholesterol-lowering diet while taking VYTORIN. Ask your doctor if you need diet information.
- Keep taking VYTORIN unless your doctor tells you to stop. If you stop taking VYTORIN, your cholesterol may rise again.

What should I do in case of an overdose?

Contact your doctor immediately.

What are the possible side effects of VYTORIN?

See your doctor regularly to check your cholesterol level and to check for side effects. Your doctor may do blood tests to check your liver before you start taking VYTORIN and during treatment.

In clinical studies patients reported the following common side effects while taking VYTORIN: headache and muscle pain (see What should I tell my doctor before and while taking VYTORIN?).

The following side effects have been reported in general use with either ezetimibe or simvastatin tablets (tablets that contain the active ingredients of VYTORIN):

- allergic reactions including swelling of the face, lips, tongue, and/or throat that may cause difficulty in breathing or swallowing (which may require treatment right away), rash, hives; joint pain; muscle pain; alterations in some laboratory blood tests; liver problems; inflammation of the pancreas; nausea; gallstones; inflammation of the gallbladder.

Tell your doctor if you are having these or any other medical problems while on VYTORIN. This is <u>not</u> a complete list of side effects. For a complete list, ask your doctor or pharmacist.

General Information about VYTORIN

Medicines are sometimes prescribed for conditions that are not mentioned in patient information leaflets. Do not use VYTORIN for a condition for which it was not prescribed. Do not give VYTORIN to other people, even if they have the same condition you have. It may harm them.

This summarizes the most important information about VYTORIN. If you would like more information, talk with your doctor. You can ask your pharmacist or doctor for information about VYTORIN that is written for health professionals. For additional information, visit the following web site: vytorin.com.

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Curtains for the Pallid Sturgeon?

Can biologists breed the "Dinosaurs of the Missouri" fast enough to stave off their extinction? **BY SAM HOOPER SAMUELS**

IT'S COLD. Here on the North Dakota-Montana border they're predicting rain, then freezing rain, then snow, up to 15 inches. Not ideal fishing weather. Still, I have traveled to the confluence of the Missouri and the Yellowstone rivers with 15 wildlife conservationists and government scientists to search for a species perilously close to extinction. We're fishing for *Scaphirhynchus albus*, the pallid sturgeon.

They call it the "Dinosaur of the Missouri," although whether for its age or its appearance is a tossup. The pallid looks more at home in a natural history museum than on the end of a fisherman's line. It has a flat, upturned shovel of a nose; long, fleshy whiskers called barbels; a knobby back; and bony protrusions called scutes, rather than scales, lining the gray skin of its body. The fish, which can weigh 80 pounds, can live 60 years or longer. For about 70 million years, since the height of the dinosaur age, the pallid sturgeon and its ancestors reigned as a top carnivore in the vast river system that drains the middle portion of the North American continent. Pallids were harvested for their flesh and their caviar, like their Russian cousins, until they were listed as endangered in 1990.

The fish is perfectly adapted for cruising the nearly opaque waters. Its eyes have shrunk to the size of beans; instead of using vision, sensors in its head detect the electric fields of prey burrowed in shallow muck. Its scoop of a snout stirs up mud in search of small fish and aquatic insects. Tucked into the fish's flat white underside is a toothless mouth that folds in like a telescope, ready to shoot outward in a flash to suck up prey.

The trouble is, the river in which pallids flourished no longer exists. In Mark Twain's day, "the turbulent, bank-caving Missouri," as he called it, changed its path capriciously, especially during spring floods, which could be devastating. The river tore up trees and hid them below the surface, where they snagged passing boats. It was dangerous for

Pallid sturgeons, which can reach six feet long and live 60 years, flourished for eons in murky American waters (the mouth of the Yellowstone River).

NEBRASKALAND MAGAZINE / NEBRASKA GAME AND PARKS COMMISSION; LARRY MAYER

Efforts to save pallids from oblivion begin with catching wild adults (biologist Mark Nelson in the Missouri River).

people to live near, and sometimes fatal to navigate.

Twain wouldn't recognize today's Missouri, tamed as it has been by the U.S. Army Corps of Engineers over the past century. It's been deepened and straightened—which has shortened it by hundreds of miles. Its banks have been lined with dikes and rocky barriers called revetments. Six major dams punctuate its path. Flooding is far less common. The seasonal high and low waters are gone, as is much of its turbidity: the Big Muddy has cleared considerably.

The high waters of spring signal the pallid to spawn, but in these meticulously managed waters, this very endangered species has not reproduced successfully for years. There are fewer underwater tree snags where they can find food and fewer shallows where their larvae are safe from predators. It's estimated that fewer than 10,000 live in the Yellowstone, Missouri and Mississippi rivers from Montana to the Gulf of Mexico; those that survive are oldsters, and they are not being replaced by new generations. The population here, in the South Dakota and Montana river system, is down to about 200 aging adults.

"Plus or minus 70," says George Jordan.

Jordan, of the U.S. Fish and Wildlife Service, is the leader of the Pallid Sturgeon Recovery Team, the crew braving the weather today. The team's goal is to catch up to 38 pallids—ideally at least a dozen females—and transport them to hatcheries where hormone treatments will induce them to breed.

Five shiny aluminum motorboats are launched. Jordan teams up with Fish and Wildlife Service colleagues Steve Krentz and Bill Bicknell, and I hop aboard with them. Krentz pilots the boat, and Jordan and Bicknell will fish. All wear waterproof neoprene hip waders. In addition, Jordan sports nifty neoprene gloves with no fingertips. He's prepared to haul nets, draw blood delicately with a syringe or jump in the river up to his chest to rock a grounded boat free.

Yesterday, a boat with a radio telemetry antenna detected signals up the Yellowstone River from pallids that had been previously tagged with transmitters. Krentz steers the boat in that direction.

"LET'S CATCH A FISH," Bicknell says. To one end of a long net he ties a basketball-size orange buoy, then swings it in a circle and lets it fly. He and Jordan begin paying out net. Krentz cuts the motor. Ten minutes is as long as a pallid can be left in a net before it gets stressed. On Krentz's signal, Bicknell and Jordan haul in the net. Empty.

Drift after drift is cast, bringing up nothing but debris. A golden eagle flies overhead. Pelicans watch the boat from sandbars. Onshore, a single oil rig pumps crude. The roar of another boat at full throttle cuts through the quiet. As it speeds past us, naturalist Mark Nelson from Montana Fish, Wildlife & Parks smiles and holds up an index and middle finger. They've caught two pallids.

Jordan and Bicknell pull in a fish. It's not a pallid, but a smallmouth buffalo, perhaps two feet long. As Jordan works to free it, the fish gives a mighty flop, driving itself farther into the net.

"We're the government," Jordan tells it. "We're here to help."

It will be the only fish he'll catch today.

Later, onshore, two pallids caught by another team are brought in, and the scene takes on the atmosphere of an emergency room at the arrival of a heart attack patient. To minimize stress, the fish must be quickly transferred from tubs of water into a large transport truck. But first, a biologist waves an electronic scanner over one of the fish, and the scanner lights up with a ten-digit code. Rob Holm, manager of the federal fish hatchery in Garrison, North Dakota, flips through a thick notebook.

"We know this fish," Holm says. It's a male that was captured and bred a year or two ago, with offspring from the breeding program already in the river. To cut down on inbreeding, the team has to throw him back.

The other fish has no tag. He's going to become a daddy this year. Tape measures flash. Numbers are called out and recorded. Snout to tail, 143 centimeters (a little under five feet). A tag about the size of a carpet tack is injected into the base of the dorsal fin. Now it's pallid number 465043745B.

Reproductive physiologist Molly Webb makes an incision with a scalpel, then inserts an otoscope to find out

US FISH AND WILDLIFE

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Though biologists readily breed pallid sturgeons (adults at a South Dakota hatchery), very few captive fish survive when released in the wild.

whether the fish is male or female. "I see nice, white testes," Webb says before suturing the fish closed.

Meanwhile, somebody dips a bucket into the tub and pours the water back in, over and over, oxygenating it. Somebody else injects the pallid with an antibiotic. A third snips two tiny wedges of webbing from its dorsal fin with scissors—a tissue sample for genetic testing.

The scutes are hard and bony, and when I rub them the wrong way, they snag my fingers. Its white belly feels like a smooth, tough sheet of wet rubber. Its gills flare bright red, a sign of stress. A clear plastic stretcher is slipped under him, and he's lifted into a white fiberglass tank on the back of a truck. To make him feel at home, the tank has been filled with water pumped from the river ten feet away. The sturgeon dives into the brown water and vanishes.

Darkness falls. The day's catch: four pallid sturgeons, two of which had already been bred in previous years and had to be thrown back. Now the other two will travel for two hours through the night, in a driving rain, to the state hatchery in Miles City, Montana, where for the next three months they'll live in a 24- by 10-foot fiberglass tank. After two weeks, the recovery team will have collected 4 females and 11 males, far short of its goal.

FROM THE OUTSIDE, the hatchery looks like an airplane hangar, a vast structure with bay doors big enough to accommodate a sizable truck. Inside, a warehouse-like space is lined with a tangle of pipes and scattered with tanks ranging in size from large barrels to small swimming pools. It's clean but smells powerfully of fish. Our two pallids are now in a fiberglass tank filled with crystal clear water, probably the cleanest they have ever been in.

The team has been capturing and breeding pallids, producing as many as 100,000 young per year, since 1997. Most of them don't survive the first few days. Those that do are released, sometimes a few weeks after hatching, sometimes when they're older, six to nine inches, and less vulnerable. Over the years, the biologists have also been collecting data to determine the best age, time and places to release. As of now, there are more questions than answers.

Ultimately, the success of the recovery effort hinges on a bigger question: Will the Missouri River ever again be a viable place for pallids to reproduce on their own? Since the middle of the 20th century, the Army Corps of Engineers, which can turn the river on and off like a faucet, has managed it largely to make barge traffic reliable and safe. Over the years, though, most freight has switched from barges to trucks. Many believe the river can soon be restored to a more natural state.

Last year, under pressure from the Fish and Wildlife Service, conservation groups and the courts, the corps agreed to open the faucet a little. This past May, a small, controlled spring rise was released, in imitation of the river's historic cycle, in hopes that the mock flood would spur the pallid sturgeon to spawn. Conservationists are anxiously waiting to see if it worked.

For now, though, the Dinosaur of the Missouri is largely relegated to reproducing indoors. The next generation of pallids will grow up not in mud, but in fiberglass. Whether there will be other generations is uncertain. The pallid's future, like the waters it dominated for millennia, is opaque.

SAM HOOPER SAMUELS *is a freelance writer and a fundraiser for Smith College. He lives in Brattleboro, Vermont.*

JOEL SARTORE

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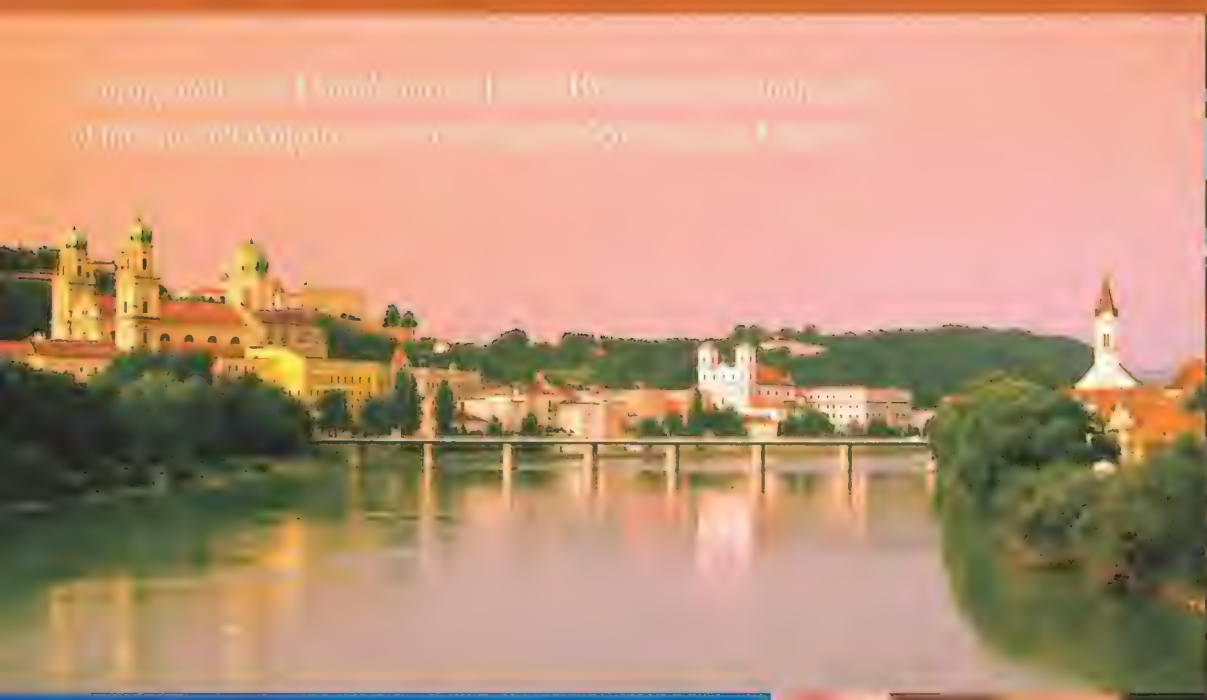

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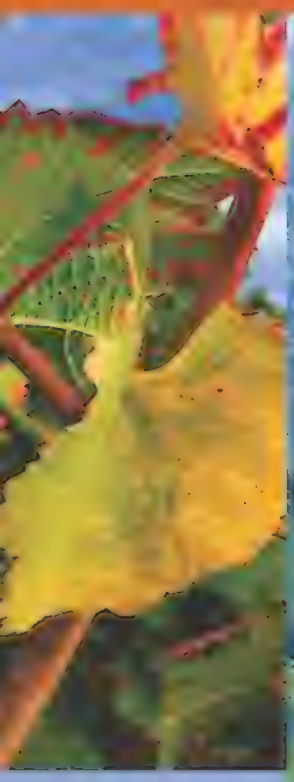

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THIS MONTH IN HISTORY

MARCH ANNIVERSARIES
MOMENTOUS OR MERELY MEMORABLE

BY ALISON McLEAN

260 YEARS AGO SHOCKING IDEAS

In March 1747 Benjamin Franklin begins documenting his experiments with electricity in a series of letters to British friend Peter Collinson. "I never was before engaged in any study that so engrossed my attention," he writes; the following year he retires from printing to pursue science. While his famous 1752 kite flight is not the first to identify lightning with electricity, Franklin's work leads to new understanding of electrical properties and uses.

140 YEARS AGO
FROZEN ASSET

Though ridiculed as an "icebox," or a "polar bear garden," some 586,000 square miles of Alaska join America when U.S. Secretary of State William Henry Seward signs a treaty to buy the land from Russia, March 30, 1867. The price tag, $7.2 million—about two cents an acre—makes for a tough sell in the Senate, which ratifies "Seward's Folly" by a single vote.

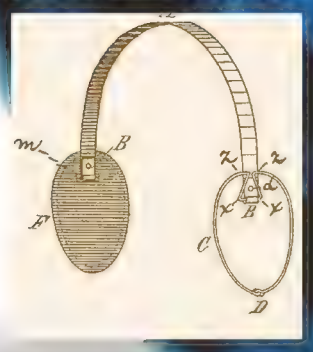
Attitudes change with the discoveries of gold later in the century. Alaska gains statehood in 1959.

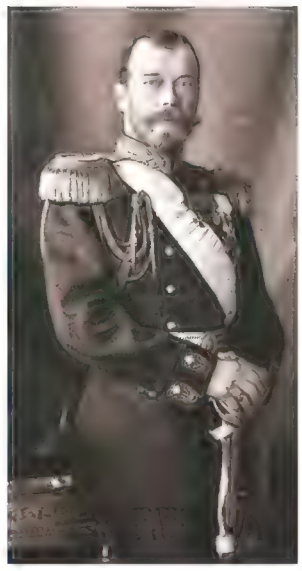
30 YEARS AGO
RUNNING RINGS AROUND IT

Using a 36-inch telescope mounted in a NASA aircraft flying 41,000 feet above the Indian Ocean, Cornell University researchers unexpectedly discover five thin rings circling the planet Uranus on March 10, 1977. Narrower than Saturn's and consisting of fragments of ice and rock, the new bands are named for letters of the Greek alphabet. Today, there are 13 known rings around the seventh planet, and Jupiter and Neptune have been found to have rings around them as well.

130 YEARS AGO
HOT STUFF

Maine teenager Chester Greenwood patents "earmufflers" March 13, 1877 (his application drawing, below). Greenwood, whose large ears make for uncomfortable ice skating, enlists his grandmother to cover connected wire loops with fur. The factory he starts will produce 400,000 earmuffs a year. Greenwood secures over 100 patents before his death in 1937.



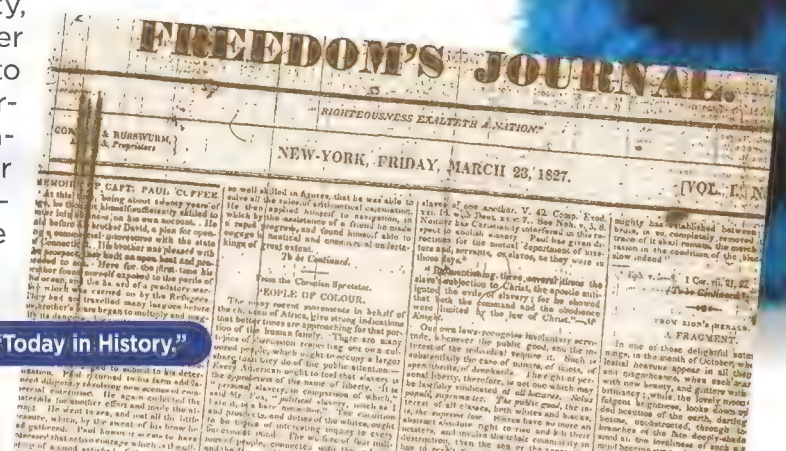


90 YEARS AGO
NICHOLAS' NIGHTMARE

With World War I going badly, workers rioting and mutiny among the troops in St. Petersburg, Czar Nicholas II abdicates his throne on March 15, 1917, "in order to save Russia," bringing a swift end to the 300-year Romanov dynasty. As a power struggle ensues between a provisional government and Bolshevik revolutionaries, Nicholas and his family are held, to be shot in July 1918.

180 YEARS AGO
FREE SPEECH

Freedom's Journal, the first African-American owned and operated newspaper, puts out its première weekly issue in New York City, March 16, 1827. The paper pleads "our own cause" to readers in 11 states, covering such noted African-Americans as shipowner Capt. Paul Cuffee, and decrying slavery, until the paper's end in 1929.



FREEDOM'S JOURNAL.

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NEW-YORK, FRIDAY, MARCH 23, 1827.

CAPT. PAUL CUFFEE

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1, 2 AND 3 MG TABLETS

Please read this summary of information about LUNESTA before you talk to your doctor or start using LUNESTA. It is not meant to take the place of your doctor's instructions. If you have any questions about LUNESTA tablets, be sure to ask your doctor or pharmacist.

LUNESTA is used to treat different types of sleep problems, such as difficulty in falling asleep, difficulty in maintaining sleep during the night, and waking up too early in the morning. Most people with insomnia have more than one of these problems. You should take LUNESTA immediately before going to bed because of the risk of falling.

LUNESTA belongs to a group of medicines known as "hypnotics" or, simply, sleep medicines. There are many different sleep medicines available to help people sleep better. Insomnia is often transient and intermittent. It usually requires treatment for only a short time, usually 7 to 10 days up to 2 weeks. If your insomnia does not improve after 7 to 10 days of treatment, see your doctor, because it may be a sign of an underlying condition. Some people have chronic sleep problems that may require more prolonged use of sleep medicine. However, you should not use these medicines for long periods without talking with your doctor about the risks and benefits of prolonged use.

Side Effects

All medicines have side effects. The most common side effects of sleep medicines are:

- Drowsiness
- Dizziness
- Lightheadedness
- Difficulty with coordination

Sleep medicines can make you sleepy during the day. How drowsy you feel depends upon how your body reacts to the medicine, which sleep medicine you are taking, and how large a dose your doctor has prescribed. Daytime drowsiness is best avoided by taking the lowest dose possible that will still help you sleep at night. Your doctor will work with you to find the dose of LUNESTA that is best for you. Some people taking LUNESTA have reported next-day sleepiness.

To manage these side effects while you are taking this medicine:

- When you first start taking LUNESTA or any other sleep medicine, until you know whether the medicine will still have some effect on you the next day, use extreme care while doing anything that requires complete alertness, such as driving a car, operating machinery, or piloting an aircraft.
- Do not drink alcohol when you are taking LUNESTA or any sleep medicine. Alcohol can increase the side effects of LUNESTA or any other sleep medicine.
- Do not take any other medicines without asking your doctor first. This includes medicines you can buy without a prescription. Some medicines can cause drowsiness and are best avoided while taking LUNESTA.
- Always take the exact dose of LUNESTA prescribed by your doctor. Never change your dose without talking to your doctor first.

Special Concerns

There are some special problems that may occur while taking sleep medicines.

Memory Problems

Sleep medicines may cause a special type of memory loss or "amnesia." When this occurs, a person may not remember what has happened for several hours after taking the medicine. This is usually not a problem since most people fall asleep after taking the medicine. Memory loss can be a problem, however, when sleep medicines are taken while traveling, such as during an airplane flight and the person wakes up before the effect of the medicine is gone. This has been called "traveler's amnesia." Memory problems have been reported rarely by patients taking LUNESTA in clinical studies. In most cases, memory problems can be avoided if you take LUNESTA only when you are able to get a full night of sleep before you need to be active again. Be sure to talk to your doctor if you think you are having memory problems.

Tolerance

When sleep medicines are used every night for more than a few weeks, they may lose their effectiveness in helping you sleep. This is known as "tolerance." Development of tolerance to LUNESTA was not observed in a clinical study of 6 months' duration. Insomnia is often transient and intermittent, and prolonged use of sleep medicines is generally not necessary. Some people, though, have chronic sleep problems that may require more prolonged use of sleep medicine. If your sleep problems continue, consult your doctor, who will determine whether other measures are needed to overcome your sleep problems.

Dependence

Sleep medicines can cause dependence in some people, especially when these medicines are used regularly for longer than a few weeks or at high doses. Dependence is the need to continue taking a medicine because stopping it is unpleasant.

When people develop dependence, stopping the medicine suddenly may cause unpleasant symptoms (see *Withdrawal* below). They may find they have to keep taking the medicine either at the prescribed dose or at increasing doses just to avoid withdrawal symptoms.

All people taking sleep medicines have some risk of becoming dependent on the medicine. However, people who have been dependent on alcohol or other drugs in the past may have a higher chance of becoming addicted to sleep medicines. This possibility must be considered before using these medicines for more than a few weeks. If you have been addicted to alcohol or drugs in the past, it is important to tell your doctor before starting LUNESTA or any sleep medicine.

Withdrawal

Withdrawal symptoms may occur when sleep medicines are stopped suddenly after being used daily for a long time. In some cases, these symptoms can occur even if the medicine has been used for only a week or two. In mild cases, withdrawal symptoms may include unpleasant feelings. In more severe cases, abdominal and muscle cramps, vomiting, sweating, shakiness, and, rarely, seizures may occur. These more severe withdrawal symptoms are very uncommon. Although withdrawal symptoms have not been observed in the relatively limited controlled trials experience with LUNESTA, there is, nevertheless, the risk of such events in association with the use of any sleep medicine.

Another problem that may occur when sleep medicines are stopped is known as "rebound insomnia." This means that a person may have more trouble sleeping the first few nights after the medicine is stopped than before starting the medicine. If you should experience rebound insomnia, do not get discouraged. This problem usually goes away on its own after 1 or 2 nights.

If you have been taking LUNESTA or any other sleep medicine for more than 1 or 2 weeks, do not stop taking it on your own. Always follow your doctor's directions.

Changes In Behavior And Thinking

Some people using sleep medicines have experienced unusual changes in their thinking and/or behavior. These effects are not common. However, they have included:

- More outgoing or aggressive behavior than normal
- Confusion
- Strange behavior
- Agitation
- Hallucinations
- Worsening of depression
- Suicidal thoughts

How often these effects occur depends on several factors, such as a person's general health, the use of other medicines, and which sleep medicine is being used. Clinical experience with LUNESTA suggests that it is rarely associated with these behavior changes.

It is also important to realize it is rarely clear whether these behavior changes are caused by the medicine, are caused by an illness, or have occurred on their own. In fact, sleep problems that do not improve may be due to illnesses that were present before the medicine was used. If you or your family notice any changes in your behavior, or if you have any unusual or disturbing thoughts, call your doctor immediately.

Pregnancy And Breastfeeding

Sleep medicines may cause sedation or other potential effects in the unborn baby when used during the last weeks of pregnancy. Be sure to tell your doctor if you are pregnant, if you are planning to become pregnant, or if you become pregnant while taking LUNESTA.

In addition, a very small amount of LUNESTA may be present in breast milk after use of the medication. The effects of very small amounts of LUNESTA on an infant are not known; therefore, as with all other prescription sleep medicines, it is recommended that you not take LUNESTA if you are breast-feeding a baby.

Safe Use Of Sleep Medicines

To ensure the safe and effective use of LUNESTA or any other sleep medicine, you should observe the following cautions:

1. LUNESTA is a prescription medicine and should be used ONLY as directed by your doctor. Follow your doctor's instructions about how to take, when to take, and how long to take LUNESTA.
2. Never use LUNESTA or any other sleep medicine for longer than directed by your doctor.
3. If you notice any unusual and/or disturbing thoughts or behavior during treatment with LUNESTA or any other sleep medicine, contact your doctor.
4. Tell your doctor about any medicines you may be taking, including medicines you may buy without a prescription and herbal preparations. You should also tell your doctor if you drink alcohol. DO NOT use alcohol while taking LUNESTA or any other sleep medicine.
5. Do not take LUNESTA unless you are able to get 8 or more hours of sleep before you must be active again.
6. Do not increase the prescribed dose of LUNESTA or any other sleep medicine unless instructed by your doctor.
7. When you first start taking LUNESTA or any other sleep medicine, until you know whether the medicine will still have some effect on you the next day, use extreme care while doing anything that requires complete alertness, such as driving a car, operating machinery, or piloting an aircraft.
8. Be aware that you may have more sleeping problems the first night or two after stopping any sleep medicine.
9. Be sure to tell your doctor if you are pregnant, if you are planning to become pregnant, if you become pregnant, or if you are breastfeeding a baby while taking LUNESTA.
10. As with all prescription medicines, never share LUNESTA or any other sleep medicine with anyone else. Always store LUNESTA or any other sleep medicine in the original container and out of reach of children.
11. Be sure to tell your doctor if you suffer from depression.
12. LUNESTA works very quickly. You should only take LUNESTA immediately before going to bed.
13. For LUNESTA to work best, you should not take it with or immediately after a high-fat, heavy meal.
14. Some people, such as older adults (i.e., ages 65 and over) and people with liver disease, should start with the lower dose (1 mg) of LUNESTA. Your doctor may choose to start therapy at 2 mg. In general, adults under age 65 should be treated with 2 or 3 mg.
15. Each tablet is a single dose; do not crush or break the tablet.

Note: This summary provides important information about LUNESTA. If you would like more information, ask your doctor or pharmacist to let you read the Prescribing Information and then discuss it with him or her.

Rx only

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Around the Mall

SCENES AND SIGHTINGS FROM THE SMITHSONIAN MUSEUMS AND BEYOND

JAY L. CLENDENIN

SQUIRRELOLOGIST

Armed with spoonfuls of peanut butter, Richard Thorington has become well acquainted with the Eastern gray squirrels across the street from the White House. A curator of mammals at the National Museum of Natural History, Thorington has been working in Lafayette Park off and on for three decades, and if it seems odd that anyone could conduct original ▶

Richard Thorington (in Washington, D.C.'s Lafayette Park) has authored a new book about everybody's favorite rodent.

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34 From the Secretary
36 The Object at Hand
38 Q&A: James Rosenquist
39 What's Up

SQUIRRELS

{ CONTINUED FROM PAGE 31 }

wildlife research in one of the nation's most public places, that's the advantage of studying squirrels. They're, well, everywhere.

A good deal of what Thorington has learned about the commander in chief's nuttiest neighbors appears in his new book, *Squirrels: The Animal Answer Guide* (Johns Hopkins University Press), a distillation of his more than 25 years of research on the squirrel family, which comprises 278 rodent species, including marmots, chipmunks and prairie dogs. The book, co-authored by Thorington's former research assistant, Katie Ferrell, clears up such questions as whether squirrels fight (yes), see in color (yes), talk (yes—*chuck chuck kwa* means "cat on the prowl") and swim (yes). Should people feed them? Sure, but not by hand, because of "how quick they are and how sharp their teeth are."

Squirrels eat "practically everything," says Thorington, "nuts, insects—even pizza."

Though widely recognized as a leading squirrelologist, Thorington, 69, started out in the 1960s studying primates in the forests of South America. Then, in 1976, he was diagnosed with Charcot-Marie-Tooth syndrome, a degenerative neurological disease, which would eventually make him quadriplegic and keep him from traveling and working in the tropics. He shifted his research to squirrels, taking advantage of the museum's unparalleled collection of 30,000 squirrel specimens.

"The disability didn't affect his eyes and observational powers," says his wife, Caroline, a printmaker who also takes photographs of her husband's squirrel subjects. "He's always someone to say 'what can I do?' and not what he can't do. He is always looking at natural history—he can't help himself."

In his backyard, in Bethesda, Maryland, Thorington has tested squirrels' jumping ability by setting a hanging feeder near a tree stump and gradually moving the feeder farther and farther away. Finally, he found that only one squirrel could make the leap, a distance of eight feet. "After that experiment," he says, "my neighbor complained that the squirrels were jumping to a bird feeder that they'd never been able to jump to before."

To conduct field research, he cruises in his motorized wheelchair seven blocks from his overstuffed office at Natural History to Lafayette Park. Among other things, he observes the surprisingly complex way in which squirrels deploy their claws. "Ligaments in the toes pull the claws up" when they're running in the grass, he says. "I'm studying the arrangement to see if it allows squirrels to rapidly retract their claws when climbing. When they're bounding up a tree, they need to be able to both grasp the bark and let it go quickly."

Not all of the animal's abilities inspire admiration. These squirrels have been known to venture across Pennsylvania Avenue to wreak havoc on the presidential tulip bulbs. "A gray squirrel," Thorington says, "cannot resist looking to see if you've buried something." { BY KATY JUNE-FRIESEN }

Dwarf Galaxies Caught Speeding

Nitya Kallivayalil didn't set out to change the way we think about our corner of the universe. But the 27-year-old doctoral student at the Harvard-Smithsonian Center for Astrophysics may have done just that. By comparing images taken two years apart with NASA's Hubble Space Telescope, Kallivayalil, her adviser Charles Alcock and astronomer Roeland van der Marel found that two neighboring dwarf galaxies called the Magellanic Clouds are moving almost twice as fast as was previously thought. "I was very surprised," says Kallivayalil.

"I'm definitely interested in what's out there in space," Kallivayalil says, "but I'm not interested in going there—unless I have to."

Astronomers have long believed that the Magellanic Clouds orbit our own, more massive galaxy, the Milky Way. But it seems the dwarf galaxies are moving so quickly that they may be zooming through our intergalactic neighborhood, destined to streak by in the next few billion years. Alternatively, if the clouds are indeed satellite galaxies, the Milky Way itself must have much more mass than is currently estimated—the extra would be needed to hold the clouds gravitationally—or it must have an irregular distribution of the dark matter that makes up most of its mass.

Either way, says Alcock, director of the Harvard-Smithsonian Center for Astrophysics, Kallivayalil's finding "adds an unexpected new perspective to the dynamics of the Milky Way galaxy." { BY DAVID ZAX }

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FROM THE SECRETARY

A Man in Full

A new biography depicts benefactor James Smithson as an exuberant, progressive man enamored of science

JAMES SMITHSON'S MYSTERY has remained unsolved for a long time—181 years. In 1826, the English scientist willed the United States his large fortune "to found at Washington, under the name . . . Smithsonian institution, an establishment for the increase & diffusion of Knowledge. . . . " But Smithson never visited the New World and wasn't known to have any American connections.

So why did he choose this country for his bequest? Traversing Europe for the past six years, historian Heather Ewing has searched for clues through handwritten documents scattered hither and yon—letters and diaries, bank ledgers, passport controls, even police records. (A fire at the Smithsonian Castle in 1865 destroyed most of Smithson's papers collected there.) Ewing's *The Lost World of James Smithson: Science, Revolution and the Birth of the Smithsonian* is being published next month by Bloomsbury USA.

In another recent Smithson biography—*The Stranger and the Statesman: James Smithson, John Quincy Adams, and the Making of America's Greatest Museum: The Smithsonian* (Perennial/HarperCollins, 2004)—journalist Nina Burleigh ably recapped what was known about Smithson. Much of Burleigh's book is about the "Statesman," John Quincy Adams. Despite Smithson's largesse, without Adams' efforts the Smithsonian would probably not exist. Both books weave thousands of graphic details about Smithson, science and European aristocracies from the 1760s to the 1840s into engaging narratives.

Before Ewing's book, Smithson was viewed as a dilettante and dejected recluse who chose the United States for his bequest out of spite against England for the stigma he suffered as the illegitimate son of a duke. Ewing doesn't gloss over Smithson's lifelong health problems or his compulsive gambling. Numerous times his friends wondered if the latter would ruin him. Her new research, however, also shows him to have been an ambitious, exuberant, progressive man. Through a lifetime of shrewd investments, Smithson turned a small inheritance into a fortune. He was a well-respected chemist and mineralogist who reveled in the huge unknowns of chemistry, a science, as he put it, "consisting of isolated points, thinly scattered, like lurid specks on a vast field of darkness." And he traveled widely, dropping into mines and climbing volcanoes as he sought specimens for his mineral collection. At least one innkeeper charged Smithson extra for his room because he had littered it with "stones and dirt."

Smithson (in 1816 portrait) was viewed as a dejected recluse.

Spite probably had something to do with Smithson's decision not to donate his fortune to Britain's premier and exclusive science organization, the Royal Society. But Ewing presents ample evidence that far more important were Smithson's fascination with the New World and his belief that the kind of utilitarian, egalitarian "public science" that most excited him and many of his compatriots would flourish best in America. This view of science was markedly different from the elitist gentleman-scholar orientation of the Royal Society.

Smithson was euphoric about the French Revolution. Many of his colleagues gave credit to the United States for inspiring it and saw America as the most progressive society on earth, one in which individuals were valued for their contributions, not their pedigrees. Fellow scientists told Smithson about meeting Ben Franklin and Thomas Jefferson in Paris and admiring their scientific knowledge. America's founders regularly praised the pursuit of science, and no doubt Smithson was impressed that the election of 1800 was a contest between the president of the American Philosophical Society, Jefferson, and the president of the American Academy of Arts and Sciences, John Adams.

Smithson's Institution has now evolved into the world's largest museum and research complex. And his generosity inspired American philanthropic support of science and culture, which to this day—at the Smithsonian and beyond—makes real his dream of knowledge accessible to all.

LAWRENCE M. SMALL
SECRETARY OF THE SMITHSONIAN INSTITUTION

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THE OBJECT AT HAND

File Cabinet, c. 1955

NATIONAL MUSEUM OF AMERICAN HISTORY

COMEDY CENTRAL

Phyllis Diller's archive holds a lifetime of proven punch lines

BY OWEN EDWARDS

"I'M NOT A COMEDIENNE," Phyllis Diller says, at home in Los Angeles, gently correcting the word I had used to describe what she does. "Comediennes may do other stuff, like acting or singing. I'm a comic, a hard-core stand-up, so I'm responsible for my own material."

Diller was one of the first celebrity comics of the television age, beginning with her appearances in the mid-1950s on the "Jack Paar Show" (the standard-setter for Carson, Leno, Letterman, et al., and, according to Diller, "the only one who ever truly understood me"). At 89, Diller, retired from life on the road and on screens big and small ("the spirit is willing but not the dangling flesh"), has recently donated her personal trove of jokes—50,000 or so, housed in a steel filing cabinet of safe-like dimensions—to the Smithsonian's National Museum of American History. Even the alphabetized categories evoke a laugh: "Science, Seasons, Secretary, Senile, Sex, Sex Symbols, Sex Harassment, Shoes, Shopping . . . " "Food Gripes, Foreign (incidents & personalities), Foundations (bra & underwear), Fractured Speech, Freeways, Friends, Frugality, Frustrations, Funerals, Funny Names . . . "

Diller's 48-drawer, alphabetized catalog of material covers subjects from Accidents to Work. The archive, she says, represents "my life in one-liners."

Diller's brand of humor was rooted in self-deprecation; she was, more often than not, her own target. Take this jibe, for example: "I love to shop for shoes," the routine goes. "It's the only place where a man tells me that I'm a 10." She was not, however, averse to skewering others. There was a time, she once quipped, when she had worked for an editor "who was so mean that he used to eat thumbtacks for breakfast with skimmed water."

"The [joke] file is like a tree," says Diller. "Leaves drop off, and new leaves are added—the new stuff pushes out the old." Along with this cache—Diller refers to it as "my life in one-liners"—she also donated memorabilia including the green-and-gold lamé gown worn on a Vietnam tour with Bob Hope in 1967, and a cigarette holder, one of Diller's signature props, that put the finishing touch on the slinky outfit. (The cigarette was wooden: "I've never smoked," she says.)

"The precision of the file's organization," says Smithsonian curator Dwight Blocker Bowers, "shows that she knew exactly what she was doing every step of the way in her career." After the museum reopens in 2008 (it's currently closed for renovations), Bowers intends to put the joke file on display, possibly as an interac-

AARON RAPOPORT / CORBIS; TOM WOLFF

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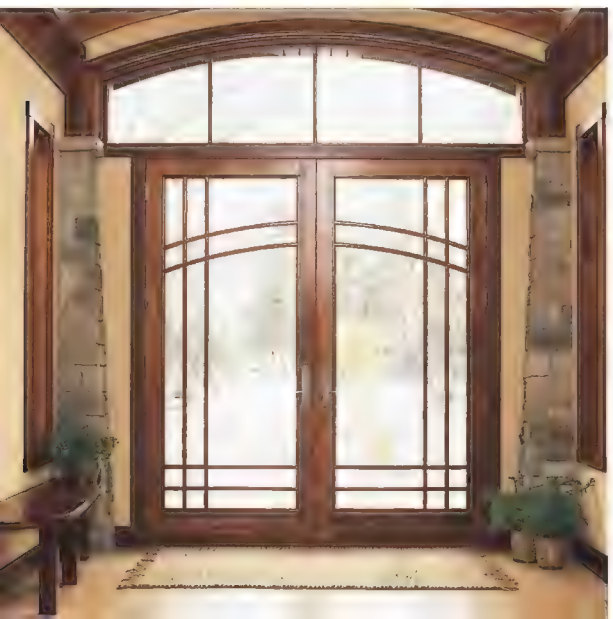

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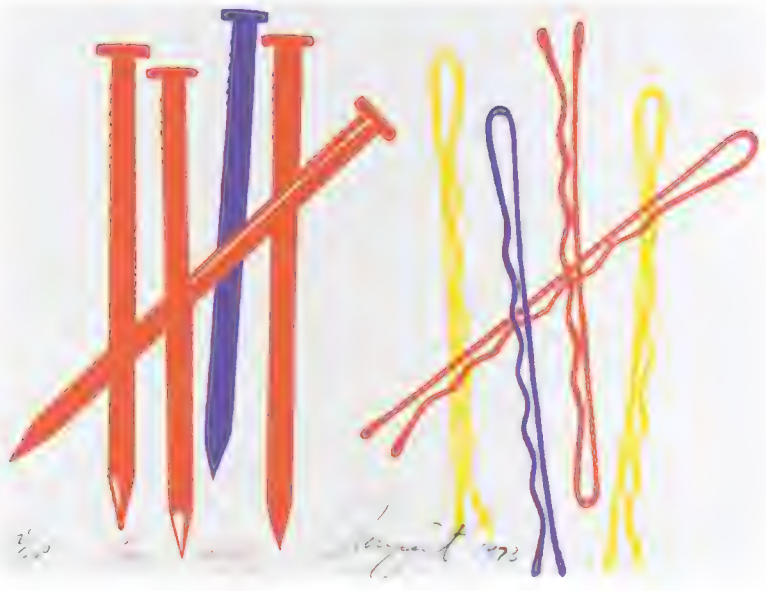
Q&A

JAMES ROSENQUIST's works are on view at both the Smithsonian American Art Museum and the Hirshhorn. The pop artist spoke with the magazine's Courtney Jordan.

WHEN YOU WERE STARTING OUT, YOU WORKED AS A BILLBOARD PAINTER IN NEW YORK CITY? I painted the Astor-Victoria sign seven times, and it's 395 feet wide and 58 feet high. I dropped a gallon of purple paint on Seventh Avenue and 47th Street from 15 stories up and didn't kill anybody. I dropped a brush at Columbus Circle. It fell on a guy's camel-hair coat. He never noticed it, and down his back was a dark green stripe. I brought artistic skill to my sign painting. I made movie stars look better. I made them real. That experience helped my fine art.

YOU PAINT ON A HUGE SCALE NOT UNLIKE MICHELANGELO AT THE SISTINE CHAPEL. ARE YOU GIVING HIM A RUN FOR HIS MONEY? I've wondered if during the Renaissance, I would have been good enough to be an assistant to Rubens or Michelangelo. They were some good old boys. But you couldn't get a job back then unless it was painting St. Sebastian or Jesus.

YOU PAINT BLUEJEANS, NAILS, BACON, BEER BOTTLES, DRILL BITS. WHAT'S THE ATTRACTION? I'm not like Andy Warhol. He did Coca-Cola bottles and Brillo pads. I used generic imagery—no brand names—to make a new kind of picture. People can remember their childhood, but events from four or five years ago are in a never-never land. That was the imagery I was concerned with—things that were a little bit familiar but not things you feel nostalgic about. Hot dogs and typewriters—generic things people sort of recognize.



***Ten Days*, 1973**

POP ART IS OFTEN CHARACTERIZED AS FRIVOLOUS, BUT YOU HAVE ADDRESSED NUCLEAR WAR, VIETNAM, THE ENVIRONMENT, AIDS. ARE YOU THE CONSCIENCE OF POP ART? That is a silly question. I'm just a painter. All my life I just do any damn thing I feel like. Lo and behold, some people like it and pay a lot of money for it. I'm not anything. I'm just curious. Doesn't everybody do that? Picasso did *Guernica*. Goya's paintings—incredible. I think Roy [Lichtenstein] and Andy Warhol were serious. Warhol was questioning the capitalist society. Certainly I have made comments on American society with the various pictures, and have done about nine antiwar paintings. But I did them because I was incorporating my feelings into my work.

IS IT HARD TO LET YOUR WORK GO? When I started out, I didn't want to sell anything because I was developing my ideas. I was trying to gather strength by putting a number of pictures together. I also kept my union card for billboard painting, so I didn't care. But I thought to myself, I have empty pockets. I could buy more paint and canvas. Now, the works are spread out all over the world, Singapore to Cologne, Germany. But I never let anything go out of my studio if I don't think it has something, an essence, because it could wind up in a museum.

tive exhibit with audio and video clips. "It will show people that comedy, for all its seeming spontaneity, is a serious business and a science."

Diller says that she always let the audience do the editing of her material for her. If people didn't laugh, or get it right away, the joke didn't survive. "You never blame the audience," she says. Thus, her advice to aspiring comics: "Go out and try it, and if you find out from the audience that you're not funny, quit."

A self-described "hard-core stand-up," Diller (2004) wrote most jokes herself.

I asked her for an example of a joke she had liked but the audience hadn't: she offered one about Fang, her onstage pet-name for her husband, Sherwood. "Fang's finest hour lasted a minute and a half." I howled, since this is a joke not only about Fang—satirized in Diller's jokes as an unrepentant couch potato—but a bit of wacky existentialism, a comment on slackerdom in all its glory.

"Well, bless your heart," Diller quips. "I wish you'd been in the audience that night."

OWEN EDWARDS *is a freelance writer and author of the book* Elegant Solutions.

SUZANNE PLUNKETT / BLOOMBERG NEWS / LANDOV; BETTMANN / CORBIS; GIFT OF THE WOODWARD FOUNDATION / SAAM, SI

What's Up

ENLIGHTENING Thomas Wilfred made "visual music" with mirrors and prisms (*Study in Depth,* 1959). Dan Flavin built minimalist sculptures out of plain fluorescent tubes. At the Hirshhorn until April 8, twenty-one modernists illuminate the artistic possibilities of light.

WASHINGTON COVERUPS

"When someone wears a hat, they stand out," says photographer Steven M. Cummings, who doffs his cap to Washington, D.C.'s African-American community with a 15-year chronicle of everyday people and their head wear. At the Anacostia Museum through April 29.

SOUTH OF THE BORDER

After photographer Eadweard Muybridge (1830-1904) murdered his wife's lover in 1874 (he was acquitted for justifiable homicide), he lay low in Central America for two years, photographing volcanoes and town squares (Panama, 1875). Trace his sojourn through 60 photos at American Art until April 29.

HARE TODAY

Not your grandma's craft bazaar: four contemporary artists working with glass, paper and ceramics (Ohio-based Beth Cavener Stichter's *One Last Word*, 2005) show edgy wares at the biennial Renwick Craft Invitational, opening March 9.

HURLY-BURLY

A troupe of Tlingit actors takes the stage at the American Indian Museum, March 8 through 18, in a new production of *Macbeth* reimagined with the dances, drums and costumes of southeast Alaska's Native people.

{ BY AMY CRAWFORD }

CLOCKWISE FROM TOP LEFT: HIRSHHORN MUSEUM, SI; EADWEARD MUYBRIDGE / SAAM, SI; PERSEVERANCE THEATRE / NMAI, SI; RENWICK GALLERY, SI; STEVEN M. CUMMINGS / ANACOSTIA COMMUNITY MUSEUM, SI

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Visit Smithsonian.com for a complete list of events and exhibitions.

After tribal chief Almir Surui, below, encouraged the mapping of resources on his people's preserve—from medicinal plants to ancestral burial grounds—loggers put a $100,000 price on his head. Says a Brazilian legislator: "Almir made his people understand the value of their culture and their land." Opposite: The Amazon loses 8,800 acres a day to deforestation.

RAIN FOR

Smithsonian
{ MARCH 2007 · VOLUME 37, NUMBER 12 }

In the Amazon, researchers documenting the ways of native peoples join forces with an embattled chief to stop illegal loggers and developers from destroying the earth's most precious wilderness

BY JOSHUA HAMMER
PHOTOGRAPHS BY CLAUDIO EDINGER

FOREST REBEL

Inside a thatched-roof schoolhouse in Nabekodabadaquiba, a village deep in Brazil's Amazon rain forest, Surui Indians and former military cartographers huddle over the newest weapons in the tribe's fight for survival: laptop computers, satellite maps and hand-held global positioning systems. At one table, Surui illustrators place a sheet of tracing paper over a satellite image of the Sete de Setembro indigenous reserve, the enclave where this workshop is taking place. Painstakingly, the team maps out the sites of bow-and-arrow skirmishes with their tribal enemies, as well as a bloody 1960s attack on Brazilian telegraph workers who were laying cable through their territory. "We Suruis are a warrior tribe," one of the researchers says proudly.

A few feet away, anthropologists sketch out groves of useful trees and plants on another map. A third team charts the breeding areas of the territory's wildlife, from toucans to capybaras, the world's largest rodent. When the task is finished, in about a month, the images will be digitized and overlaid to create a map documenting the reserve in all its historical, cultural and natural richness. "I was born in the middle of the forest, and I know every corner of it," says Ibjaraga Ipobem Surui, 58, one of the tribal elders whose memories have been tapped. "It's very beautiful work."

The project, intended to document an indigenous culture, appears harmless enough. But this is a violent region, where even innocuous attempts to organize the Indians can provoke brutal responses from vested interests. In the past five years, 11 area tribal chiefs, including 2 members of the Surui tribe and 9 from the neighboring Cinta Largas, have been gunned down—on the orders, say tribe members, of loggers and miners who have plundered Indian reserves and who regard any attempt to unite as a threat to their livelihoods. Some of these murdered chiefs had orchestrated protests and acts of resistance, blocking logging roads and chasing gold miners from pits and riverbeds—actions that disrupted operations and caused millions of dollars in lost revenue. In August, the Surui chief who, along with tribal elders, brought the map project to the reserve, 32-year-old Almir Surui, received an anonymous telephone call warning him, he says, to back off. "You are potentially hurting many people," he says he was told. "You'd better be careful." Days later, two Surui youths alleged at a tribal meeting that they had been offered $100,000 by a group of loggers to kill Almir Surui.

For the past 15 years, Almir—a political activist, environmentalist and the first member of his tribe to attend a university—has been fighting to save his people and the rain forest they inhabit in the western state of Rondônia. His campaign, which has gained the support of powerful allies in Brazil and abroad, has inspired comparisons to the cru-

Freelancer **JOSHUA HAMMER** *is based in Berlin. Photographer* **CLAUDIO EDINGER** *works out of Sao Paulo, Brazil.*

The Surui are recording both their reserve's natural and historical resources. (The cartographic team, opposite, created a map, below, detailing everything from wildlife to ancient trees). Although Brazil protected indigenous territories in the 1980s, many miners and loggers ignore Native boundaries; they see cultural mapping as a threat (illegally cut Surui timber, above). Says Surui elder Ibjaraga Ipobem of the mapping: "I was born in the middle of the forest, and know every corner of it. It's very beautiful work."

AMAZON CONSERVATION TEAM (3); P. 40 CLAUDIO EDINGER / CORBIS; PP. 40,41 ANTONIO SCORZA / AFP / GETTYIMAGES

sade of Chico Mendes, the Brazilian rubber tapper who led a highly publicized movement against loggers and cattle ranchers in neighboring Acre state in the 1980s. "If it weren't for people like Almir, the Surui would have been destroyed by now," says Neri Ferigobo, a Rondônia state legislator and an important political ally. "He's brought his people back from near extinction; he's made them understand the value of their culture and their land."

Almir's campaign has reached its fullest expression in the mapmaking project. Besides documenting the tribe's history and traditions and detailing its landscape, in an endeavor known as ethnomapping, his scheme could have significant economic effect. As part of the deal for bringing ethnomapping to his people—an ambitious project that will provide training, jobs and other benefits to the near-destitute Surui—Almir persuaded 14 of the 18 Surui chiefs to declare a moratorium on logging in their parts of the reserve. Although the removal of timber from the indigenous areas is illegal, an estimated 250 logging trucks go in and out of the reserve monthly, according to tribal leaders, providing timber to 200 sawmills, employing some 4,000 people, scattered throughout the region. After Almir persuaded the chiefs to unite in a logging ban, many of them threw chains over logging roads, and the amount of timber leaving the rain forest has decreased. That's when the first death threat came in. In mid-August, Almir flew for his own protection to Brasília, where federal police promised to launch an investigation and provide him with bodyguards; neither, he says, was forthcoming. Days later, an American environmental group, the Amazon Conservation Team (ACT), evacuated him to Washington, D.C., where he remained until late September. After returning home, he says, someone tried to run him off the road as he traveled back to the reserve. "I have no doubt they were trying to kill me," he says.

When I asked him if he saw parallels between himself and Chico Mendes, who was shot dead by a contract killer at his home in December 1988, he waved his hand dismissively. "I've got no desire to become a dead hero," he replied. Asked what precautions he was taking, however, he shrugged and, with a touch of bravado, answered: "I rely on the spirits of the forest to protect me."

I FIRST MET ALMIR on a humid morning in mid-October, after flying three hours north from Brasília to Porto Velho (pop. 305,000), Rondônia's steamy capital and the gateway to the Amazon. The chief had been back in Brazil only a couple of weeks following his hasty evacuation to Washington. He had invited me to travel with him to the Sete de Setembro Reserve, the 600,000-acre enclave set aside for the Surui by the Brazilian government in 1983. The reserve is named after the day, September 7, 1968, that the Surui had their first face-to-face contact with white men: the meeting took place after Brazilian officials from the Indian affairs department had placed trinkets—machetes, pocketknives, axes—in forest clearings as a gesture of friendship, gradually winning the Indians' trust. (By coincidence, the 7th of September is also the date, in 1822, that Brazil declared its independence from Portugal.)

Almir was waiting at the arrival gate. He is a short, stocky man with a bulldog head, a broad nose and jet-black hair cut in traditional bangs in front and worn long in back. He greeted me in Portuguese (he speaks no English) and led the way to his Chevrolet pickup truck parked out front. Almir was joined by Vasco van Roosmalen, Brazil program director for the Amazon Conservation Team, which is funding the ethnomapping project. A tall, amiable, 31-year-old Dutchman, van Roosmalen grew up in the Brazilian Amazon, where his father, a noted primatologist, discovered several new species of monkey. Also on the trip was Uruguayan Marcelo Segalerba, the team's environmental coordinator. After a lunch of dorado stew, manioc and rice at a local café, we set out on the Rondônia Highway, the BR-364, on the 210-mile drive southeast to the reserve, past cattle ranches, farms and hardscrabble towns that looked as if they'd been thrown up overnight. As we approached

the ramshackle roadside settlement of Ariquemes, Almir told us, "This land belonged to the Ariquemes tribe, but they were wiped out by the white men. Now the only trace of them is the name of this town."

LESS THAN two generations ago, the Surui were among several large groups of Indians who roamed an area of primary rain forest along the borders of what are now Rondônia and Mato Grosso states. They wore loincloths, lived off the animals they hunted with bows and arrows and trapped in the forest, and battled for territory with other tribes in the area. (Known in their own language as the Paiterey, or "Real People," the Surui acquired their now more commonly used name in the 1960s. That was when Brazilian government officials asked the rival Zora tribe to identify a more elusive group the officials had also seen in the forest. The Zora answered with a word that sounded like "surui," meaning "enemy.") Then, in the early 1980s, Brazil embarked on the most ambitious public-works project in the country's history: a two-lane asphalt road that today runs east-west for at least 2,000 miles from the state of Acre, through Rondônia and into the neighboring state of Mato Grosso. Financed by the World Bank and the Brazilian government, the multi-billion-dollar project attracted hundreds of thousands of poor farmers and laborers from Brazil's densely populated south in search of cheap, fertile land. A century and a half after the American West was settled by families in wagon trains, Brazil's conquest of its wilderness unfolded as newcomers penetrated deeper into the Amazon, burning and clear-cutting the forest. They also clashed frequently, and often violently, with indigenous tribes armed only with bows and arrows.

What followed was a pattern familiar to students of the American West: a painful tale of alcoholism, destruction of the environment and the disappearance of a unique culture. Catholic and evangelical missionaries stripped the Indians of their myths and their traditions; exposure to disease, especially respiratory infections, killed off thousands. Some tribes simply vanished. The Surui population dropped from about 2,000 before "contact" to a few hundred by the late 1980s. The psychological devastation was nearly as severe. "When you have this white expansion, the Indians start seeing themselves as the white man sees them—as savages, as obstacles to development," explains Samuel Vieira Cruz, an anthropologist and a founder of Kanindé, an Indian rights group based in Porto Velho. "The structure of their universe gets obliterated."

For the Surui, traditional existence remains relatively intact (most of the tribe live in thatched dwellings, above, surrounded by wildlife, from parrots to monkeys, opposite). Although Brazil recognized the Indians' right to their land and way of life in 1988, loggers and miners continue to assassinate tribal leaders; in the past five years, two Surui chiefs and nine chiefs from a nearby tribe have been gunned down. In August, after Almir Surui initiated the mapping project, he received an anonymous warning: "You'd better be careful."

In 1988, faced with a population on the verge of dying out, Brazil ratified a new constitution that recognized the Indians' right to reclaim their original lands and preserve their way of life. Over the next decade, government land surveyors demarcated 580 Indian reserves, 65 percent of them in the Amazon. Today, according to FUNAI, the federal department established in 1969 to oversee Indian affairs, Indian tribes control 12.5 percent of the national territory, though they number just 450,000, or .25 percent of Brazil's total population. These reserves have become islands of natural splendor and biodiversity in a ravaged landscape: recent satellite imagery of the Amazon shows a few islands of green, marking the Indian enclaves, surrounded by vast splotches of orange, where agriculture, ranching and logging have eradicated the woodlands.

The Brazilian government has been largely supportive of the Amazon mapmaking projects. In 2001 and 2002, the Amazon Conservation Team collaborated on two ambitious ethnomapping schemes with FUNAI and remote indigenous tribes in the Xingu and Tumu-

CLAUDIO EDINGER / CORBIS

cumaque reserves. In 2003, the Brazilian ambassador to the United States, Roberto Abdenur, presented the new maps at a press conference in Washington. According to van Roosmalen, ACT maintains "good relationships" with nearly all agencies of the Brazilian government that deal with Indian affairs.

But the future of the reserves is in doubt. Land disputes between Indians and developers are growing, as increasing assassinations of tribal leaders attest. A 2005 report by Amnesty International declared that the "very existence of Indians in Brazil" is being threatened. Pro-development politicans, including Ivo Cassol, the governor of Rondônia, who was returned to office with 60 percent of the vote this past September, call for the exploiting of resources on Indian reserves. Cassol's spokesman, Sergio Pires, told me matter-of-factly that "the history of colonization has been the history of exterminating Indians. Right now you have small groups left, and eventually they will all disappear."

Throughout Brazil, however, advocates of rain forest preservation are countering pro-development forces. President Lula da Silva recently announced a government plan to create a coherent rain forest policy, auctioning off timber rights in a legally sanctioned area. Jorge Viana, former governor of the state of Acre, told the *New York Times*, "This is one of the most important initiatives that Brazil has ever adopted in the Amazon, precisely because you are bringing the forest under state control, not privatizing it." Another state governor, Eduardo Braga of Amazonas, created the Zona Franca Verde (Green Free Trade Zone), which lowered taxes on sustainable rain forest products, from nuts to medicinal plants, in order to increase their profitability. Braga has set aside 24 million acres of rain forest since 2003.

CLAUDIO EDINGER / CORBIS; DAVID DODSON

The stakes are high. If indigenous peoples disappear, environmentalists say, the Amazon rain forest will likely vanish as well. Experts say as much as 20 percent of the forest, sprawling over 1.6 million square miles and covering more than half of Brazil, has already been destroyed. According to Brazil's Environmental Ministry, deforestation in the Amazon in 2004 reached its second-highest rate ever, with ranchers, soybean farmers and loggers burning and cutting down 10,088 square miles of rain forest, an area roughly the size of Vermont. "The fate of indigenous cultures and that of the rain forest are intricately intertwined," says Mark Plotkin, founding director of ACT, which is providing financial and logistical support to the Surui's mapping project and several others in the rain forest. So far the organization has ethnomapped 40 million acres in Brazil, Suriname and Columbia. By 2012, it hopes to have put together maps covering 138 million acres of Indian reserves, much of it contiguous. "Without the rain forest, these traditional cultures cannot survive," Plotkin says. "At the same time, indigenous peoples have repeatedly been shown to be the most effective guardians of the rain forests they inhabit."

AFTER TWO DAYS driving into the Amazon with Almir, we turned off from the Rondônia Highway and bounced down a dirt road for half an hour. Farmers with blond hair and Germanic features stared impassively from the roadside—part of a wave of migrants who came up to the Amazon from the more densely populated southern Brazilian states in the 1970s and '80s. Just before a sign that marks the entrance to the Sete de Setembro Reserve, Almir pulled up next to a small lumber mill. It was one of dozens, he said, that have sprung up on the edge of the reserve to process mahogany and other valuable hardwoods plundered from the forest, often with the complicity of tribal chiefs. Two flatbed trucks, piled with 40-foot logs, were parked in front of a low, wood-plank building. The sawmill operator, accompanied by his adolescent son, sat on a bench and stared, unsmiling, at Almir. "I've complained about them many times, but they're still here," Almir told me.

Moments later, we found ourselves in the jungle. The screams of spider and howler monkeys and the squawks of red macaws echoed from dense stands of bamboo, wild papaya, mahogany, bananas and a dozen varieties of palm. It had rained the night before, and the truck churned in a sea of red mud, grinding with difficulty up a steep hill.

We arrived at a small Surui village, where a mapmaking seminar was taking place. Tribal elders had been invited here to share their knowledge with researchers on the project. They congregated on benches around rough tables beneath a palm-frond canopy, alongside a creek that, I was told, was infested with piranhas. The elders were striking men in their 50s and 60s, a few even older, with bronze skin, black hair cut in bangs and faces adorned with tribal tattoos—thin blue lines that ran horizontally and vertically along their cheekbones. The oldest introduced himself as Almir's father, Marimo Surui. A former tribal chief, Marimo, 85, is a legend among the Indians; in the early 1980s, he single-handedly seized a logging truck and forced the

driver to flee. Dozens of policemen surrounded the truck in response, and Marimo confronted them alone, armed only with a bow and arrow. "They had machine guns and revolvers, but when they saw me with my bow and arrow, they shouted, 'Amigo! Amigo! Don't shoot,' and tried to hide behind a wall," he told me. "I followed them and said, 'You cannot take this truck.'" The police, apparently bewildered by the sight of an angry Indian in war paint with a bow and arrow, retreated without firing a shot.

The incident will undoubtedly be included in the Surui map. In the first phase of the process, Indians trained as cartographic researchers traveled to villages across the reserve and interviewed shamans (the Surui have only three left, all in their 80s), tribal elders and a broad spectrum of tribe members. They identified significant locations to be mapped—ancestral cemeteries, ancient hunting grounds, battle sites and other areas of cultural, natural and historical importance. In phase two, the researchers journeyed on foot or by canoe through the reserve with GPS systems to verify the places described. (In previous mapmaking exercises, the elders' memories of locations have proved nearly infallible.) The initial phase has brought younger Indians in touch with a lost history. Almir hopes that by infusing the Surui with pride in their world, he can unite them in resistance to those who want to eradicate it.

Almir (above, with his father, Marimo, and Vasco van Roosmalen and, opposite, in Virginia in 2006) joined with members of the Amazon Conservation Team (ACT), an Arlington, Virginia-based group that has underwritten cultural mapping across the Amazon Basin. "Indigenous peoples," says American ethnobotanist and ACT founder Mark Plotkin (left, with a Tirio shaman in Suriname), "have been shown to be the most effective guardians of the rain forest."

ALMIR SURUI is one of the youngest Surui members with a clear memory of the early Indian-white battles. In 1982, when he was 7, the Surui rose up to drive settlers out of the forest. "The Surui came to this settlement with bows and arrows, grabbed the white invaders, hit them with bamboo sticks, stripped them and sent them out in their underwear," Almir tells me, as we sit on plastic chairs on the porch of his blue-painted concrete-block house in Lapetania on the southwest edge of the reserve. The hamlet is named after a white settler who built a homestead here in the 1970s. The cleared land was taken back by the Indians in the wake of the revolt; they built their own village on top of it. Shortly thereafter, the police foiled a planned massacre of the Surui by whites; FUNAI stepped in and marked out the borders of the Sete de Setembro Reserve.

The demarcation of their territory, however, could not keep out the modern world. And though the Surui were forced to integrate into white society, they derived few benefits from it. A shortage of schools, poor medical care, alcoholism and steady depletion of the forest thinned their ranks and deepened their poverty. This problem only increased in the late 1980s, when the Surui divided into four clans and dispersed to different corners of the reserve, a strategic move intended to help them better monitor illicit logging. Instead, it turned them into factions.

At age 14, while attending secondary school in Cacoal, Almir Surui began showing up at tribal meetings at the reserve. Three years later, in 1992, at 17, he was elected chief of the Gamep, one of the four Surui clans, and began looking for ways to bring economic benefits to his people while preserving their land. He came to the attention of an indigenous leader in Brazil's Minas Gerais state, Ailton Krenak, who helped him obtain a scholarship to the University of Goiânia, near Brasília. "Education can be a double-edged sword for the Indians, because it brings them into contact with white men's values," says Samuel Vieira Cruz. "Almir was an excep-

CLAUDIO EDINGER / CORBIS; AMAZON CONSERVATION TEAM

tion. He spent three years in college, but he kept his ties to his people."

Almir got his first big opportunity to demonstrate his political skills a couple of years later. In the mid-1990s, the World Bank launched a $700 million agricultural project, Plana Fora, designed to bring corn-threshing equipment, seeds, fertilizers and other aid to the reserves. Almir and other tribal leaders soon realized, however, that the Indians were receiving almost none of the promised money and material. In 1996, he confronted the World Bank representative and demanded that the lender bypass FUNAI, the intermediary, and give the money directly to the tribes. In Porto Velho, Almir organized a protest that drew 4,000 Indians from many different tribes. Then, in 1998, the young chief was invited to attend a meeting of the World Bank board of directors in Washington, D.C. where a restructuring of the project would be discussed.

Twenty-three years old, speaking no English, Almir and another Brazilian rain forest activist, Jose Maria dos Santos, who had joined him on the trip, checked into a Washington hotel and ventured out to find something to eat. They walked into the first restaurant they happened upon and pointed at random to items on the menu. The waitress laid a plate of sushi in front of Almir and a chocolate cake before his colleague. "We skimmed the chocolate fudge off the cake and didn't eat anything else," he says. For the next week, he says, the two ate all their meals at a chicken rotisserie near their hotel. He convinced the World Bank to audit its loan to Rondônia.

Back home, Almir began reaching out to the press, religious leaders and sympathetic politicians to publicize and support his cause. Powerful government figures came to see him as a threat. "The governor pleaded with me to stop the [World Bank] campaign, and he offered me 1 percent of the $700 million project to do so. I refused," Almir tells me. "Later, in Porto Velho, [the governor's staffers] put a pile of cash in front of me, and I said, 'Give me the telephone and I'll call *O Globo* [one of Brazil's largest newspapers] to photograph the scene.' They said, 'If you tell anybody about this you will disappear.'" In the end, the World Bank plan was restructured, and the Indians did get paid directly.

Other accomplishments followed. Almir successfully sued the state of Rondônia to force officials to build schools, wells and medical clinics within the reserve. He also focused on bringing the Surui back from near extinction, advising families to have more children and encouraging people from other tribes to settle on Surui land; the population has risen from several hundred in the late 1980s to about 1,100 today, half of what it was before contact. "Without Almir, his work and leaders like him, the Surui would probably have joined tribes like the Ariquemes and disappeared into the vacuum of Rondônia history," van Roosmalen told me. "One has to remember what stakes these people are facing. It is not one of poverty versus riches, but survival in the face of annihilation."

SOON AFTER WE ARRIVE in the Surui villages to observe the mapmaking project, Almir leads me through a hodgepodge of thatched and tin-roofed structures surrounding an unkempt square of grass and asphalt. A dozen women, surrounded by naked children, sit on the concrete patio of a large house making necklaces out of armadillo spines and palm seed shells. A broken Honda motorbike rusts in the grass; a capuchin monkey sits tethered by a rope. A bristly wild pig, somebody's pet, lies panting in the noonday heat. The village has a shabby, somnolent air. Despite Almir's efforts, economic opportunities remain minimal—handicraft selling and cultivation of manioc, bananas, rice and beans. A few Surui are teachers at the reserve's primary school; some of the elders collect government pensions. "It's a poor place," Almir says. "The temptation to surrender to the loggers are great."

With the encouragement of Almir and a handful of like-minded chiefs, the Surui have begun exploring economic alternatives to logging. Almir leads van Roosmalen and me on a trail that wanders past his village; we are quickly swallowed up by the rain forest. Almir points out mahogany saplings that he has planted to replace trees cut down illegally. The Surui have also revived a field of shade-grown coffee started decades ago by white settlers. His "50-year plan" for Surui development, which he and other village chiefs drafted in 1999, calls also for extraction of therapeutic oils from the copaiba tree, the cultivation of Brazil nuts and acai fruits and the manufacture of handicrafts and furniture. There is even talk about a "certified logging" program that would allow some trees to be cut and sold under strict controls. Profits would be distributed among tribe members, and for every tree cut, a sapling would be planted.

After half an hour, we arrive at an Indian roundhouse, or *lab-moy*, a 20-foot-high, dome-like structure built of thatch, supported by bamboo poles. Almir and two dozen other Surui built the structure in 15 days last summer. They intend to use it as an indigenous research and training center. "The struggle is to guarantee [the Surui] alternative incomes: the process has now begun," Almir says.

He has no illusions about the difficulty of his task, realizing that the economic alternatives he has introduced take time and that the easy money proffered by loggers is hard to resist. "The chiefs know it's wrong, but they're attracted to the cash," van Roosmalen says. "The leaders get up to $1,000 a month. It's the most divisive issue that the Surui have to deal with." Henrique Yabadai Surui, a clan chief and one of Almir's allies in the fight, had told me that the unity

AMAZON CONSERVATION TEAM

of 14 chiefs opposed to logging has begun to fray. "We've started receiving threats, and there's no security. Messages have been sent: 'Stop getting in the way.' It is very difficult. We all have children that we need to take care of."

We stop unannounced at an Indian village at the eastern edge of the reserve. A logging truck, with five huge hardwoods stacked in back, is parked on the road. We walk past barking dogs, chickens and the charred remains of a roundhouse that burned down the week before in a fire that was started, we are told, by a 6-year-old boy who had been playing with matches. Joaquim Surui, the village chief, is taking a nap in a hammock in front of his house. Wearing a T-shirt bearing the English words LIVE LIFE INTENSELY, he jumps to his feet. When we inquire about the truck, he fidgets. "We're not permitting logging anymore," he says. "We're going to try out economic alternatives. That lumber truck was the last one we allowed. It's broken down, and the driver went off to get spare parts." Later, I ask Almir if he believes Joaquim's story. "He's lying," he says. "He's still in business with the loggers."

Almir Surui doesn't expect much official help. Although FUNAI, the Indian affairs agency, is charged with protecting natural resources within the reserves, several former FUNAI officials are said to have ties to the timber and mining industries, and the agency, according to indigenous leaders and even some FUNAI administrators, has been ineffectual in stopping the illegal trade.

Neri Ferigobo, the Rondônia legislator and ally of the Surui, says FUNAI remains vulnerable to pressure from top politicians in the Amazon. "All Rondônia's governors have been development-oriented," he charges. "The people who founded Rondônia had a get-rich-quick mentality, and that has carried down to today."

As for Almir Surui, he is on the road constantly these days, his work funded by the Brazilian government and various international organizations, particularly the Amazon Conservation Team. He commutes by small planes between Brasília, Porto Velho and other Brazilian cities, attending a stream of donor meetings and indigenous affairs conferences. He says he gets barely four days a month at home, not enough to keep in close touch with his community. "I'd like to spend more time here, but I've got too many responsibilities."

I asked Neri Ferigobo, Almir's ally in the Rondônia state legislature, if Almir's increasing activism made his assassination likely. "People know that if Almir is killed, he'll be another Chico Mendes, but that doesn't give him total protection," Ferigobo told me. "Still, I think Almir will survive. I don't think they'd be that rash to kill him."

ABOUT 4 P.M. of the third day, the mapmaking seminar draws to a close. The Indians are preparing to celebrate with an evening of dancing, singing and displays of bow-and-arrow prowess. With the encouragement of Almir and other Indian leaders, the tribe has revived its traditional dances and other rituals. Outside the schoolhouse, a dozen elders have adorned themselves in feathered headdresses and belts of armadillo hide; now they daub themselves with black war paint made from the fruit of the jenipapo tree. (The elders insist on decorating me as well, and I reluctantly agree; it will take more than three weeks for the paint to fade.) Marimo Surui, Almir's father, brandishes a handmade bow and a fistful of arrows; each has been fashioned from two harpy-eagle feathers and a slender bamboo shaft that narrows to a deadly point. I ask how he feels about the work his son is doing, and about the threats he has received. He answers in his native Indian language, which is translated first into Portuguese, then English. "It's bad for a father to have a son threatened," he says, "but everyone of us has passed through dangerous times. It is good that he's fighting for the future."

The survival of the Surui (whose population is increasing and whose traditions, including mastery of the bamboo flute, below, are reviving) depends on income from sources other than loggers. Almir has a "50-year plan" for sustainable development, based on resources from shade-grown coffee to the cultivation of nuts and fruits.

Almir lays a hand on his father's shoulder. He has painted the lower part of his face the color of charcoal, and even dressed in Western clothing—jeans, polo shirt, Nikes—he cuts a fierce figure. I ask him how white Brazilians react to him when he is so adorned. "It makes them nervous," he tells me. "They think it means that the Indians are getting ready for another war." In a way, that war has already begun, and Almir, like his father 25 years before him, stands virtually unprotected against his enemies.

CLAUDIO EDINGER / CORBIS (2)

I'll never forget the friendliness and friendship of everyone — guests and hosts alike. The places, the cultures, the unexpected; the dinners that were so divine. I wished for a dream journey and I wouldn't have wished for anything different.

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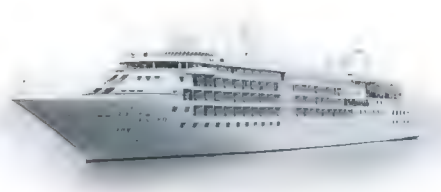

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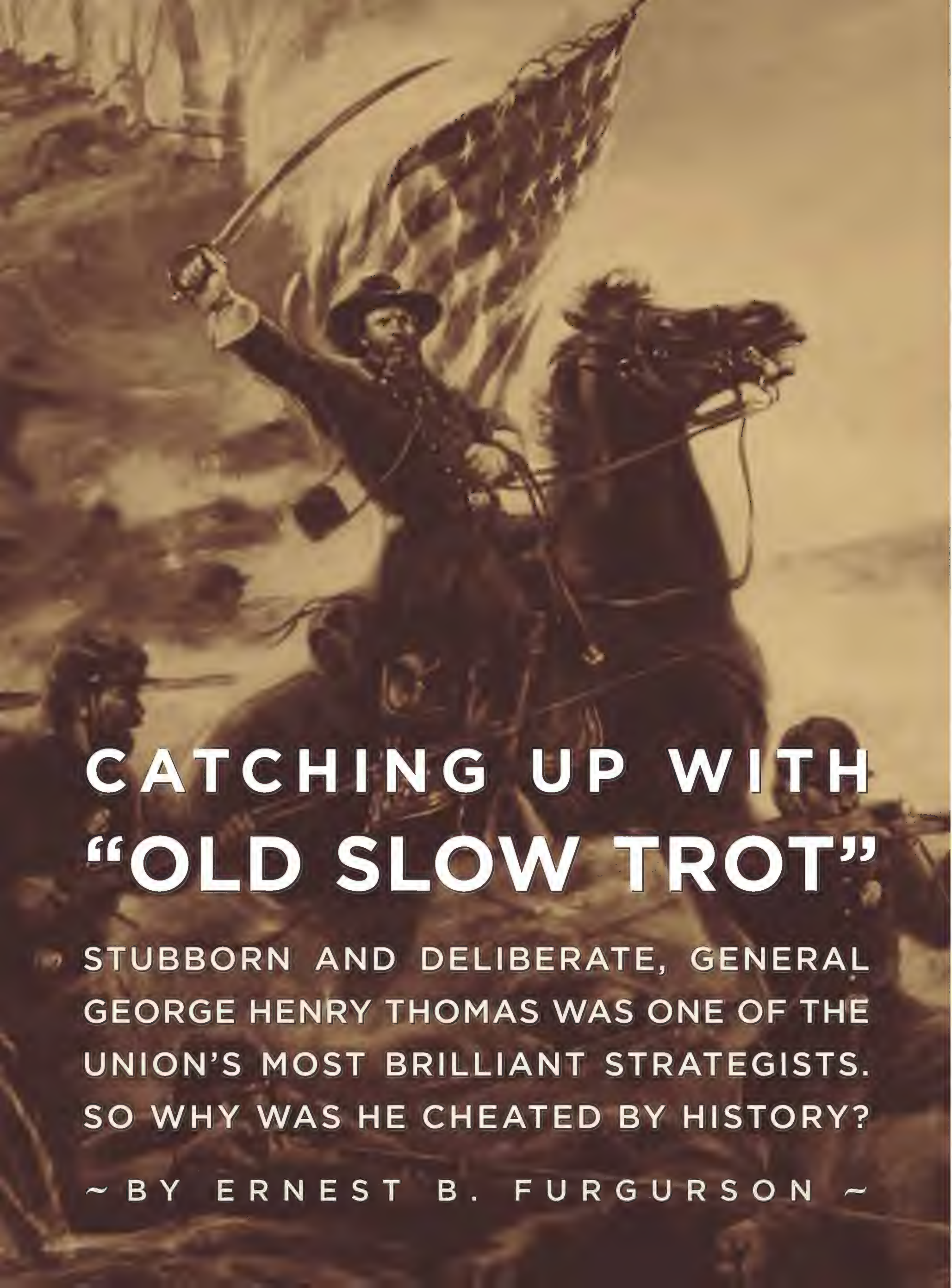

CATCHING UP WITH "OLD SLOW TROT"

STUBBORN AND DELIBERATE, GENERAL GEORGE HENRY THOMAS WAS ONE OF THE UNION'S MOST BRILLIANT STRATEGISTS. SO WHY WAS HE CHEATED BY HISTORY?

~ BY ERNEST B. FURGURSON ~

OUT OF THE AUGUST NIGHT, James Gurley came galloping past the massive oak before Elizabeth Thomas' white plantation house. Get out! he shouted. Take your family and run! Now! The renegade slave leader Nat Turner was coming with a band of vengeful slaves, rampaging from farm to farm, killing white men, women and children.

George Henry Thomas, 15, piled into a carriage with his mother and sisters and racketed along dirt roads into the darkness. Before they had gone far, afraid the assassins would overtake them, they abandoned the carriage and took to the woods. In and out of gloomy Mill Swamp, across Cypress Bridge and the bottomlands of the Nottoway River, they escaped to the county seat of Jerusalem, some 12 zigzag miles from home.

Nat Turner's 1831 insurrection, in Southampton County, Virginia, was the bloodiest slave uprising in American history. Before it ended, 55 whites were killed. It stirred deep fears across the South, sweeping aside any talk of gradual emancipation, and hardened both sides in the long-running debate that ended in civil war. What it did to young George Thomas, who as a Union general became one of the most successful, most controversial, yet least recognized figures of that war, remains a question unsettled.

While Turner and his band, armed with guns, clubs, axes and swords, carried out their gruesome task, Thomas' mother led her family to safety, helped to do so by some of her own slaves, according to local tradition. George's father had died two years earlier. The boy's uncle, James Rochelle, who had mentored him since his father's death, was clerk of the court where Turner confessed and was hanged that November. Young George was immersed in the initial panic, the mobilization of militia and the fury of citizens demanding prompt justice. He heard talk that all the trouble would never have happened if Turner had not been taught to read and write.

Teaching slaves was illegal in Virginia and across the South, but George was among the many who had broken the law, teaching his own family's 15 slaves to read.

After attending the local academy, he became his uncle's deputy clerk and took up the study of law at the county courthouse. But he was restless, and gladly accepted an appointment from his congressman to the U.S. Military Academy at West Point. He would long remember the parting advice he got from his brother John: "Having done what you conscientiously believe to be right, you may regret, but should never be annoyed by, a want of approbation on the part of others." It was advice that would prove prophetic.

Nearly six feet tall, solid in body and stubborn in temperament, George was almost 20 years old when he arrived at West Point. His roommate was a red-haired, impulsive Ohioan named William Tecumseh "Cump" Sherman. They became friendly rivals, and after four years Sherman had finished 6th, Thomas 12th, among the 42 members of the class of 1840. Along the way, Thomas put a halt to the hazing of some fellow cadets by threatening to throw a bullying upperclassman out a barracks window; after years helping supervise a sprawling plantation, he had learned to exert calm authority. Among the cadets, his gravitas earned him his first of many nicknames: Old Tom.

Five months after graduation, Thomas sailed for Florida and the long, ugly little war begun by Andrew Jackson to force the Seminole Indians onto reservations. Thomas' captain wrote an appraisal that would well describe his entire career: "I never knew him to be late or in a hurry. All his movements were deliberate, his self-possession was supreme, and he received and gave orders with equal serenity."

REAL WAR LAY AHEAD in Mexico, where as an artillery lieutenant under Gen. Zachary Taylor in 1846, Thomas won honorary promotion to captain for his conduct in the pitched battle of Monterrey. Then Thomas was breveted to major for the way he handled his guns at Buena Vista, when Taylor defeated Mexican general Santa Anna in the last major battle in northern Mexico.

Southampton County was proud of its son, and presented him a magnificent sword, its gold pommel clasping an amethyst, its silver scabbard engraved with the names of his battles. On its grip was the image of an elephant—among soldiers, to have been in combat was to have "seen the elephant." And Thomas was still devoted to home: disappointed that his brother had not picked a bride for him, George said, "I would prefer one from the old state to any

"This army does not retreat," Gen. George H. Thomas famously asserted. Later in 1863, he rallied Union troops in the Battle of Chickamauga, in Georgia (left). His equanimity shows in a Civil War portrait, as it did in the heat of combat.

NATIONAL PORTRAIT GALLERY, SMITHSONIAN INSTITUTION / ART RESOURCE, NY; P. 50 RUDY AYOROA / DAVID PERRY COLLECTION

other, and as I am now so much of a stranger there I am afraid I should not know where to look. . . . " In his letters, he worried about his unmarried sisters, left lonely on the farm, saying "domestic differences are to me the most horrible of which I can conceive." He could not yet imagine the scope of the domestic differences that lay ahead.

In 1851 he headed to the prize assignment of artillery instructor at West Point. At every stop since his first arrival there, he had met and measured cadets and fellow officers who would figure in his future—Sherman, J.E.B. Stuart, John Schofield, William Rosecrans, Braxton Bragg, John Bell Hood, among dozens destined to become famous in Civil War history. None was more impressive than the superintendent of the academy, Lt. Col. Robert E. Lee, and no one there impressed Lee more positively than upright, conscientious George Thomas.

Under Lee, Thomas had the additional duty of cavalry instructor. In that role, Thomas won yet another nickname, Old Slow Trot, for restraining cadets from galloping their mounts. Since his brother had not found him a bride, Thomas found his own—tall, strong-minded Frances Kellogg, an upstate New Yorker, cousin of a cadet from Troy. He wore his ceremonial sword for the only time in his life when they were married in the academy chapel in November 1852.

Within six months, Thomas had to leave his bride for duty in the far Southwest; it would be three years before he saw her again. In a desert clash with a Comanche brave, he narrowly escaped death when an arrow glanced off his chin before lodging in his chest. Thomas pulled it out and, after a surgeon dressed the wound, went about his business. Then, in 1860, with the country in crisis after Abraham Lincoln was elected president, Thomas headed home on leave.

While there, he worried about his future as the Southern states began to secede. Governor John Letcher offered to make him Virginia's chief of ordnance. In turning that position down, Thomas wrote: "It is not my wish to leave the service of the United States as long as it is honorable for me to remain in it, and therefore as long as my native State Virginia remains in the Union it is my purpose to remain in the Army, unless required to perform duties alike repulsive to honor and humanity."

On a bloody night in 1831, still remembered in Southampton County, Virginia, Nat Turner led fellow fugitive slaves in an uprising, killing 55 whites. The 15-year-old Thomas fled the mob with his family. But later he joined the Union fight against slavery.

A month later, in April 1861, on the day Confederate guns opened against Fort Sumter in Charleston Harbor, Thomas sent telegrams to his wife and sisters, stating that he would remain loyal to the Union. We do not know exactly what he said then or what was going on inside him at other critical moments, because all his personal papers were destroyed. But his wife said that "whichever way he turned the matter over in his mind, his oath of allegiance to his Government always came uppermost." When Lincoln called for troops to put down the insurrection, Virginia joined the Confederacy, along with most of her professional soldiers. But Thomas stayed true to his oath, and to this day has been reviled by many Southerners for that decision.

EVEN HIS OWN SISTERS turned his picture to the wall and denied that they had any such brother. They returned his letters unopened and ignored his request to send him the ceremonial sword he had left with them for safekeeping. He also lost contact with his brothers. Some called him a turncoat.

The truth is that Thomas, like many other soldiers, was torn by the wrenching decision he was forced to make. So was his friend Lee, who opposed secession and agonized over resigning from the U.S. Army that he had served so faithfully. But Lee ultimately headed South, saying he could not bring himself to fight against his home, family and friends. It is also true that Lee had a much larger stake in Virginia, in its plantations and history, than Thomas did in his more modest place in Southampton. And besides his loyalty to the old flag, Thomas was committed to a Northern wife who was as strongly Unionist as his sisters were secessionist.

His memories of Nat Turner's insurrection might have hardened him into a determined defender of slavery, as it did for so many of the Southern officers who went with the Confederacy. Instead—perhaps remembering the eager blacks he had taught to read and write—he fought to overturn the "peculiar institution." Though he left no bold statements of how he felt, when his duty came to include ending slavery, he carried it out just as forcefully as when it stood for simply preserving the Union.

Those who protest Thomas' decision have made less of the fact that old Winfield Scott, general in chief of the Army in the early months of the war, was also a Virginian. He had been a national figure since the War of 1812, but by

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late 1861 he had retired and no longer mattered. Tens of thousands of Southerners fought for the Union, but Thomas has been the focus of resentment for one reason: he was a better general than the others.

As early as his cadet days, Thomas' contemporaries had seen a resemblance to George Washington in his classic profile, his integrity and his restrained power. In 48 months of war, as his brown hair and well-trimmed beard began to gray, he would attain a certain grandeur that only strengthened that comparison. He seldom showed his explosive temper, but when he did, it was remembered. He disdained theatrics and politics; to general and future president James A. Garfield, his whole life seemed "frank and guileless." Thus in character, if not in gambling instinct, he also closely resembled Lee, who was a role model for so many younger officers who served under him.

Thomas would earn the undying loyalty of soldiers like Henry Van Ness Boynton, who won the Congressional Medal of Honor fighting under him in 1863. Boynton wrote that Thomas "looked upon the lives of his soldiers as a sacred trust, not to be carelessly imperiled. Whenever he moved to battle, it was certain that everything had been done that prudence, deliberation, thought and cool judgment could do under surrounding circumstances to ensure success commensurate with the cost of the lives of men. And so it came to pass that when the war ended it could be truthfully written of Thomas alone that he never lost a movement or a battle."

But for Thomas, every battlefield success seemed to stir controversy or the jealousy of ambitious rivals. Unlike other noted generals, he had no home-state politicians to lobby on his behalf in Washington. Ulysses S. Grant, for example, was championed by Illinois congressman Elihu Washburne, and Sherman by his brother, Ohio senator John Sherman. For Thomas, every step upward depended solely on his performance in the field.

In one of the war's first skirmishes, he led a brigade in the Shenandoah Valley that bested Confederates under Stonewall Jackson. When the dashing Rebel J.E.B. Stuart heard that Thomas was commanding Union cavalry, he wrote to his wife that "I would like to *hang* him as a traitor to his native state." Even after that, there was lingering doubt among some Unionists, including Lincoln. Unlike Grant, Sherman, George McClellan and some other ranking Union officers who had broken their military service with years as civilians, Thomas had been a soldier since the day he entered West Point. Yet when his name came up for promotion, the president, restrained by Northern radicals and surrounded in the Federal bureaucracy by Southerners, said, "let the Virginian wait." But Sherman among others vouched for Thomas, and soon the Virginian was elevated to brigadier general and ordered to organize troops away from Virginia, beyond the Appalachians.

There, in January 1862, he sent a bulletin of encouragement to a Union hungry for good news. After an 18-day march on muddy roads, his division confronted Rebels at Mill Springs, Kentucky. Amid cold rain and gun smoke, he led his outnumbered troops in repulsing Confederates under Maj. Gen. George Crittenden and then drove them across the Cumberland River. Though not a massive victory, it was the first notable Northern success of the war, turning back a Confederate move from eastern Tennessee into Kentucky. Thomas was promoted to major general, an advancement that would soon create friction with his old roommate "Cump" Sherman and Grant, who had become

George Thomas attracted controversy on all sides. Perhaps out of jealousy, Union generals Ulysses S. Grant and William T. Sherman called him slow. Some historians rate Thomas above Union general Philip Sheridan but below Sherman. In an early clash in the Shenandoah Valley, Thomas bested the seemingly invincible Confederate general Thomas J. "Stonewall" Jackson and earned the respect—and scorn—of Confederate general J.E.B. Stuart, who considered his fellow Virginian a traitor.

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so close that an affront to either was resented by both.

After winning praise for capturing Forts Henry and Donelson in western Tennessee, Grant had fallen out of favor for mismanaging and very nearly losing the bloody Battle of Shiloh. He was criticized for taking 13,000 casualties and was suspected of drinking on the job. Sherman, whose excitability and wild overestimates of Rebel strength had caused some to question his sanity, had fought bravely after an initial mistake at Shiloh. When Union forces moved south toward Corinth, Mississippi, that spring, Union general Henry Halleck shunted Grant into a figurehead role and gave Thomas temporary command of the wing that included Grant's Army of the Tennessee. Grant, angered, was talked out of quitting by Sherman. Grant would not forget the incident.

Grant and Sherman would redeem themselves by grasping control of the Mississippi River in the costly, circuitous campaign that resulted in the capture of Vicksburg in mid-1863. While they were operating on the Mississippi, Thomas led a corps in Rosecrans' Army of the Cumberland, earning respect in fights like that at Stones River, where he declared, "This army does not retreat," and backed up his words with actions on the field. There and at Tullahoma, Rosecrans' force pressed the Confederates back into eastern Tennessee.

Union soldiers guard a vital railroad bridge between Nashville and Chattanooga (1864). When Thomas could not repel enemy raids on such crossings, he shrewdly dispatched special crews to repair them.

As Thomas rose, he proved to his men that his addiction to detail and his insistence on preparation saved lives and won battles. His generalship behind the front, before the battle, was generations ahead of his peers. He organized a professional headquarters that made other generals' staff work seem haphazard. His mess and hospital services, his maps and his scouting network were all models of efficiency; he was never surprised as Grant had been at Shiloh. He anticipated modern warfare with his emphasis on logistics, rapidly repairing his railroad supply lines and teaching his soldiers that a battle could turn on the broken linchpin of a cannon. He demanded by-the-book discipline, but taught it by example. He made no ringing pronouncements to the press. His troops came to understand his fatherly concern for their welfare, and when they met the enemy they had faith in his orders.

In late summer, Rosecrans moved against the Rebel stronghold of Chattanooga, a crucial gateway between the eastern and western theaters of war. Confederate general Bragg pulled out of the town onto the dominating nearby mountains, waiting for Maj. Gen. James Longstreet to bring reinforcements from Virginia. When they came, Bragg threw everything into an assault on Union lines along Chickamauga Creek, just inside Georgia. Thomas' corps was dug in on the Union left. On the second day of furious fighting, a misunderstood order opened a wide gap on his right. Longstreet's Rebels crashed through; with the always aggressive John Bell Hood's division leading, they bent the Union line into a horseshoe.

Rosecrans, certain the battle was lost, retreated into Chattanooga with five other generals and thousands of blue-uniformed soldiers. But Thomas inspired his men to stand fast, and only their determined resistance saved his army from destruction. They held all that afternoon against repeated Confederate assaults, withdrawing into Chattanooga after nightfall. It was the greatest of all battles in the West, and since that day, Thomas has been known to history as the Rock of Chickamauga.

FOR THEIR ACTIONS, Rosecrans was fired and Thomas took command of the Army of the Cumberland. But the Union situation remained dire. Bragg, still holding those formidable mountains, laid siege to Chattanooga. Grant, commanding Union armies between the Mississippi and the mountains, ordered Thomas to hold the city "at all costs," and rushed troops east to help.

"I will hold the town till we starve," Thomas replied, and they almost did starve. Cut off from supplies, his army was living on half rations. Thousands of horses and mules died. Weeks passed before Grant assembled strength sufficient to lift the siege. The key terrain was towering Missionary Ridge. Grant ordered Sherman to drive onto the ridge from the left and Maj. Gen. Joseph Hooker from the right, with Thomas aimed at the center. Sherman tried and failed to carry his end, but Hooker's troops took Lookout Mountain on the far flank. Thomas waited for Grant's order to advance. When it came, Thomas took his time studying the crest with his binoculars, then sent his troops ahead with orders to occupy only the first line of the Confederate works. They did so in fine style—and then, seeing that they were exposed to fire from above, kept going. Thomas was surprised and Grant angry, demanding "Who ordered those

GEORGE N. BARNARD / MEDFORD HISTORICAL SOCIETY / CORBIS

men up the hill?" No one had. The troops plunged ahead, pressing on against heavy fire, struggling up the steep slope and jubilantly planting their flag on the heights for all to see.

Assistant Secretary of War Charles A. Dana, an eyewitness, called the assault "one of the greatest miracles in military history. . . . as awful as a visible interposition of God." Thomas, moved by the sight, ordered that a cemetery be created for his soldiers on a beautiful slope of the battlefield. When a chaplain asked if the dead should be separated by state, Thomas did not hesitate. "No, no," he said. "Mix them up. Mix them up. I'm tired of states' rights." Once he had made up his mind to stay with the old flag, he never expressed misgivings; if he had them, they had long been erased by seeing so many men die to preserve the Union.

By late 1883, U.S. Colored Troops were filling some of the gaps opened in Federal forces by battle and disease. Although Sherman had resisted using black soldiers, Thomas gladly accepted them. In the drastic move from serfdom to freedom, he wrote, it was probably better for ex-slaves to be soldiers, and thus gradually learn to support themselves, than "to be thrown upon the cold charities of the world without sympathy or assistance."

As the Federals gathered strength to thrust into Georgia, this was not the only disagreement between the tightly strung Ohioan and the calm Virginian. In early March, Lincoln called Grant east to become general in chief of all Northern armies. No one was surprised that Grant's friend Sherman, rather than Thomas, replaced him as commander in the West, even though as a major general Thomas was senior to Sherman. Ex-colonel Donn Piatt, a 19th-century booster and biographer of Thomas, called it "the nakedest favoritism that ever disgraced a service."

At the start of his 1864 drive toward Atlanta, Sherman rejected Thomas' plan to take his command through Snake Creek Gap to cut off and smash

RICHARD ROBINSON

THE FORGOTTEN GENERAL

HISTORIANS OFFER DIFFERENT EXPLANATIONS of why George H. Thomas has been subordinated to Grant, Sherman and Sheridan.

The only notable tribute to Thomas at West Point is a plaque on an administration building that was once the stables for black cavalrymen after the Civil War. Col. James T. Seidule, chief of military history at the U.S. Military Academy, admits that this marker "probably isn't the memorial he deserves. I personally think he is vastly underrated, though he is starting to receive the attention he deserves."

Seidule believes that Grant, Sherman and Sheridan were more celebrated in part because they all went on to be generals in chief, thus raising their stature among professional soldiers. At West Point today, Seidule teaches the importance of Thomas' role at Chickamauga, Missionary Ridge and Nashville, and says, "We really highlight the moral courage he exhibited by staying with the Union despite all of the pressure to join his home state."

Thomas' treatment at West Point is also a symbol of how he has been handled by history, compared with the millions of favorable words written and spoken about top generals who were his contemporaries.

James I. Robertson Jr., biographer of Stonewall Jackson and a longtime professor of Civil War history at Virginia Tech, thinks Thomas deserves greater fame. He blames not only the general's disputed reputation for caution, but also his "lack of exciting or captivating personality such as found in Sherman. . . . Thomas was methodical and diligent—traits that do not allow much room for engaging personality. Such were his assets and his debits. While many equate him with [James] Longstreet for slowness, other historians rank him with Grant and Sherman as the leaders in ultimate Union victory."

John Bowers, author of *Chickamauga and Chattanooga*, agrees, writing that "Thomas was never the life of a party. He neither rose from poverty nor went off the deep end through drink or craziness. Could Thomas be a little too boring to fit comfortably into the American mythology? Thomas seems to have always, maddeningly, done the right thing."

Professor Mark Grimsley of Ohio State University, a prolific analyst of Civil War leadership, ranks Thomas below Sherman and above Sheridan, but says, "The more I learn about him, the more respectful I become." Thomas' place in historiography partly replicates "the contemporary tension between him and the Grant/Sherman crowd," Grimsley adds.

Grimsley thinks the main reason that Thomas is less known today is because "we have no truly satisfactory biography." Most of those done in the decades after the war were overly praiseful, and the absence of a recent biography (not to mention a personal memoir like those left by the other generals, who long outlived him) has deprived Thomas of recognition by the broader public.

Not every historian agrees. Steven Woodworth of Texas Christian University, whose book on the Army of the Tennessee focuses on Sherman, considers Thomas "the most overrated general of the war." He sees a tendency "to make Thomas into a superman, able to leap tall buildings in a single bound or capture Atlanta by the end of May 1864. I don't believe he could have performed either of those feats."

In Kentucky, in 1887, a military post—Fort Thomas—was named for the general; today it is a city of 17,000. But in other parts of the South, the Thomas name still sparks disagreement.

In July 1985, the state of Virginia placed his childhood home on its tour of historic sites and erected a roadside marker to identify it. But aside from the General Thomas Highway near his home, there is no monument to the Union general.

"I don't know if he will ever be a hero in Southampton," says Lynda Updike, president of the county's historical society. "But one has to admire his desire to choose the side he felt was right rather than to follow his peers."

George Thomas may have been right when he told a fellow officer, "Time and history will do me justice." But they seem in no hurry to do so. ***—E.B.F.***

George Thomas never returned to his birthplace in Southampton, Virginia. But he always remembered its sheltering oaks—and made the acorn the symbol of his army corps.

Joseph Johnston's Confederate army. More than a month into Georgia, an impatient Sherman complained to Grant that Thomas' Army of the Cumberland was slowing his advance—"a fresh furrow in a plowed field will stop the whole column." He was still in this mood a few days later when he ignored Thomas' advice against attacking the strongly entrenched Rebels head-on at Kennesaw Mountain. The Federals lost more than 2,000 troops in trying to take what Thomas had warned was an impregnable position.

Thomas commanded about two-thirds of Sherman's infantry; his army was the center force, the sledgehammer in the four-month campaign, and led the way into Atlanta. But neither Sherman, Grant, Secretary of War Edwin Stanton nor Lincoln cited Thomas in their congratulations. As in the 1864 Virginia campaign, where all the official praise and headlines went to Grant, in Georgia it was all Sherman. In his special order announcing the victory, Sherman credited Maj. Gen. Henry W. Slocum's corps with entering the city first—although Slocum was under Thomas' command and had headed the corps for only six days.

Thomas made meticulous preparations for the December 1864 battle for Nashville, scoring a spectacular victory over Gen. John Bell Hood's Confederates. The clash effectively ended fighting in the West. Grateful comrades raised a statue to Thomas in Washington, D.C., where he has stood watch over vehicular traffic since 1879.

When Atlanta's mayor protested Sherman's harsh military rule, the general replied, "War is cruelty and you cannot refine it . . . those who brought war into our country deserve all the curses and maledictions a people can pour out. . . . You might as well appeal against the thunderstorm." Then he set out on his storied march to infamy and greatness, pillaging the countryside as he cut a great swath through the Confederacy.

Thomas took a different view. Stern though he was in combat, he posted a guard at the house of a citizen suspected of disloyalty because, he said, "We must remember that this is a civil war, fought to preserve the Union that is based on brotherly love and patriotic belief in the one nation. . . . The thing becomes horribly grotesque . . . when we visit on helpless old men, women, and children the horrors of a barbarous war. We must be as considerate and kind as possible, or we will find that in destroying the rebels we have destroyed the Union."

Opposite in personality, tactics and philosophy, Thomas and Sherman were thereafter gratefully separated in geography as well. While Grant grappled with Lee in Virginia and Sherman gutted the eastern Confederacy, Thomas was sent back to Tennessee to reorganize the stripped-down Army of the Cumberland and deal with Hood. The Confederate general had got away from Atlanta with some 40,000 troops and evaded Sherman's effort to catch him. Now he was marching north through Tennessee. Thomas' Federals under John Schofield slowed and badly damaged the Rebels in the fierce battle of Franklin, but by December Hood was dug in on the high ground facing Nashville. Thomas fortified the city while he gathered strength for a decisive blow, but to carry it out he needed more men, horses and supplies.

GRANT, 500 miles away, grew impatient. He sent telegrams urging Thomas to move, then ordered him to "attack at once." Thomas said after the war that he was tempted—"grossly improper as it would have been"—to ask why Grant himself, who was entrenched around Petersburg, was not fighting. Defeat at Nashville "would have been a greater calamity than any which had befallen the Federal forces," he said. "It would have cleared the way for the triumphant march of Hood's army through Kentucky, and a successful invasion of Indiana and Illinois, in which there were no Federal troops. It was therefore of the last importance that the battle upon which so much depended should not be fought until I was ready for it." Thomas continued planning, training, stocking—equipping his horsemen with the new breech-loading Spencer carbines.

Then, just when he was ready, a sleet storm froze both armies in place for days. Grant, furious that Thomas had failed to engage the enemy, decided to relieve him from command, first with one general, then another. Finally he started to go west to fire him in person. But before he left Washington, the ice melted in middle Tennessee.

On December 15, Thomas, unaware that Grant intended to fire him, roared out of his works against Hood. In two days his troops crushed the Rebel army. His infantry, including two brigades of U.S. Colored Troops, smashed into Hood's troops while the Union cavalry, dismounted with its fast-firing Spencers, curled around and behind the Rebel

MINNESOTA HISTORICAL SOCIETY / CORBIS

Visit Smithsonian.com for an interview with the author.

left. Almost a century later, historian Bruce Catton summed up the battle in two words: "Everything worked."

Thomas "comes down in history . . . as the great defensive fighter, the man who could never be driven away but who was not much on the offensive. That may be a correct appraisal," wrote Catton, an admirer and biographer of Grant. "Yet it may also be worth making note that just twice in all the war was a major Confederate army driven away from a prepared position in complete rout—at Chattanooga and at Nashville. Each time the blow that finally routed it was launched by Thomas."

Nashville was the only engagement in which one army virtually annihilated another. Thomas B. Buell, a student of Civil War generalship, wrote that in Tennessee, Thomas performed the war's "unsurpassed masterpiece of theater command and control. . . . So modern in concept, so sweeping in scope, it would become a model for strategic maneuver in 20th-century warfare." After it, there was no more large-scale fighting west of the Blue Ridge.

When the bloodshed was over at last, after Lincoln was assassinated and the nation was recovering from the shock, 150,000 soldiers of all the Union armies converged on Washington for the most memorable victory parade in the nation's history. All of them, that is, except the Army of the Cumberland. When Sherman proudly passed in review before Grant, President Andrew Johnson and multitudes of cheering onlookers, Thomas had already said goodbye to his few remaining troops. Back in Nashville, in a message that his innate reserve did not let him utter in person, he described his thoughts as he watched their last parade:

> *"The coldest heart must have warmed" at seeing the men who had endured "this great, modern tragedy," he wrote—men "who had stemmed with unyielding breasts the rebel tide threatening to engulph the landmarks of freedom, and who, bearing on their bronzed and furrowed brows the ennobling marks of the years of hardship, suffering and privation, undergone in defense of freedom and the integrity of the Union, could still preserve the light step and wear the cheerful expressions of youth."*

Thomas' own youth was long behind him. In four years of hard service, he had taken not a single day of leave. During Reconstruction, he commanded troops in Kentucky, Tennessee, Mississippi, Alabama and Georgia. He was considerate toward ragged defeated soldiers, but he was as strict as the angriest Northern Radical in opposing the Ku Klux Klan and defiant politicians. "Everywhere in the states lately in rebellion, treason is respectable and loyalty odious," he said. "This, the people of the United States, who ended the rebellion and saved the country, will not permit."

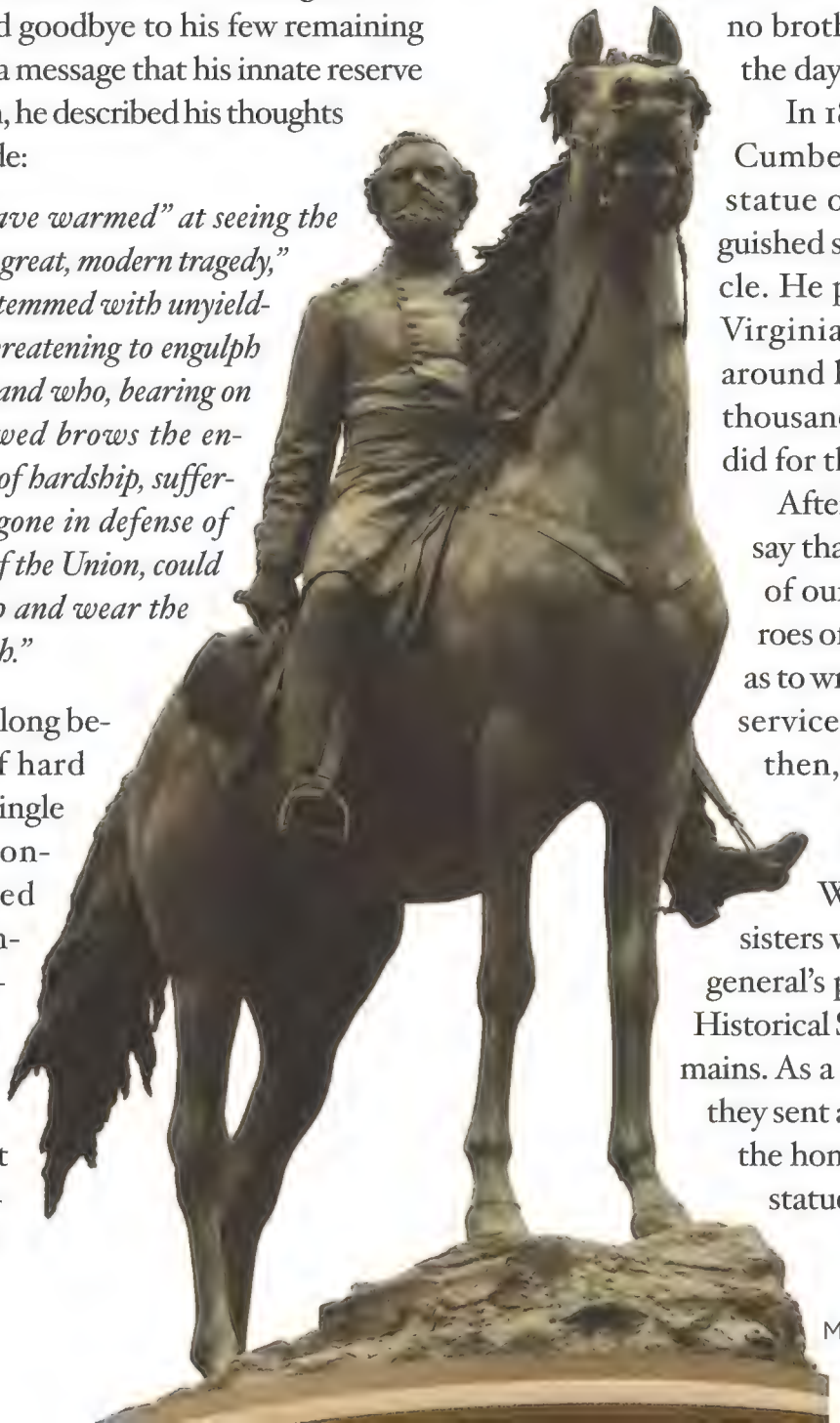
When President Johnson wanted to make him a full general, Thomas declined, understanding the move as Johnson's attempt to sidetrack Grant's progress toward the White House. He said he had done nothing since the war to deserve promotion, and if the honor was for wartime service, it had come too late. When he heard talk of nominating him for president, he staunched that too. So Grant was duly elected, in 1868, and soon afterward transferred Thomas to San Francisco. There, in 1870 at the age of 53, the Rock of Chickamauga suffered a stroke and died.

THE TRAIN BEARING his body crossed the country to his wife's hometown of Troy, New York, with troops firing salutes along the way. President Grant and General in Chief Sherman, putting aside for the moment their criticism of Thomas, led the throng of mourners at the funeral. But no one was there from the Thomas family of Southampton County. Shortly after Lee's surrender, Union general John Gibbon had heard that the Thomas sisters were suffering, and sent them a wagonload of supplies as a token of his friendship for their brother. Judith Thomas would not accept, insisting she had no brother George, that he had died on the day Virginia seceded.

In 1879, veterans of the Army of the Cumberland dedicated an equestrian statue of Southampton's most distinguished son in Washington's Thomas Circle. He peers down 14th Street toward Virginia today, as dense traffic runs around him; perhaps one passerby in a thousand knows who he is and what he did for the nation.

After Thomas died, Grant was able to say that he was "one of the great names of our history, one of the greatest heroes of our war." Sherman relented so far as to write that "during the whole war his services were transcendent." Yet even then, the two generals seldom mentioned his name without repeating their assertions of his caution. When the two surviving Thomas sisters were nearing 90, they allowed the general's prize sword to go to the Virginia Historical Society in Richmond, where it remains. As a further gesture of reconciliation, they sent acorns from the great oak outside the home place to be planted around his statue in Washington.

The acorns never sprouted.

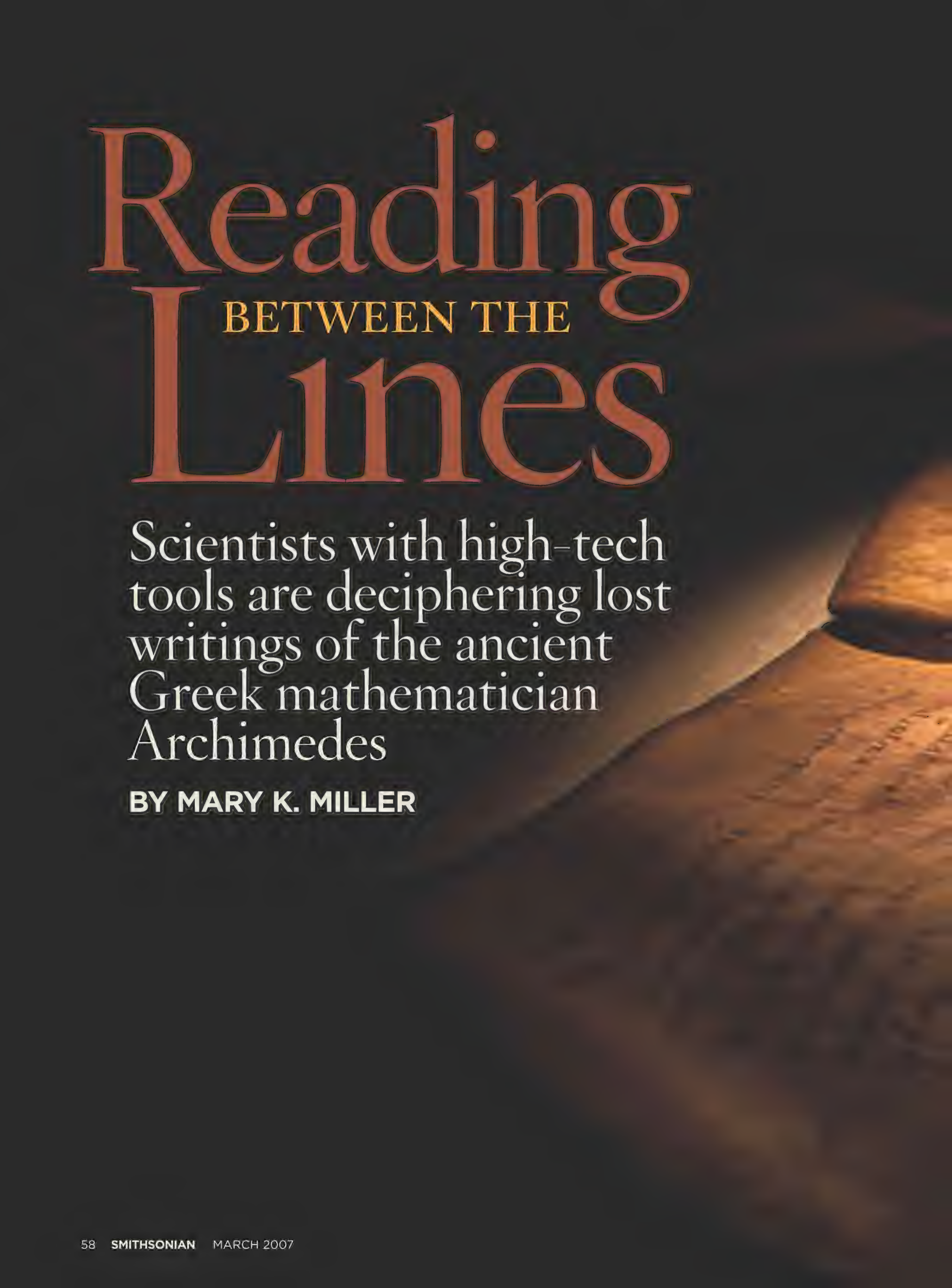


TOM WOLFF

Reading BETWEEN THE Lines

Scientists with high-tech tools are deciphering lost writings of the ancient Greek mathematician Archimedes

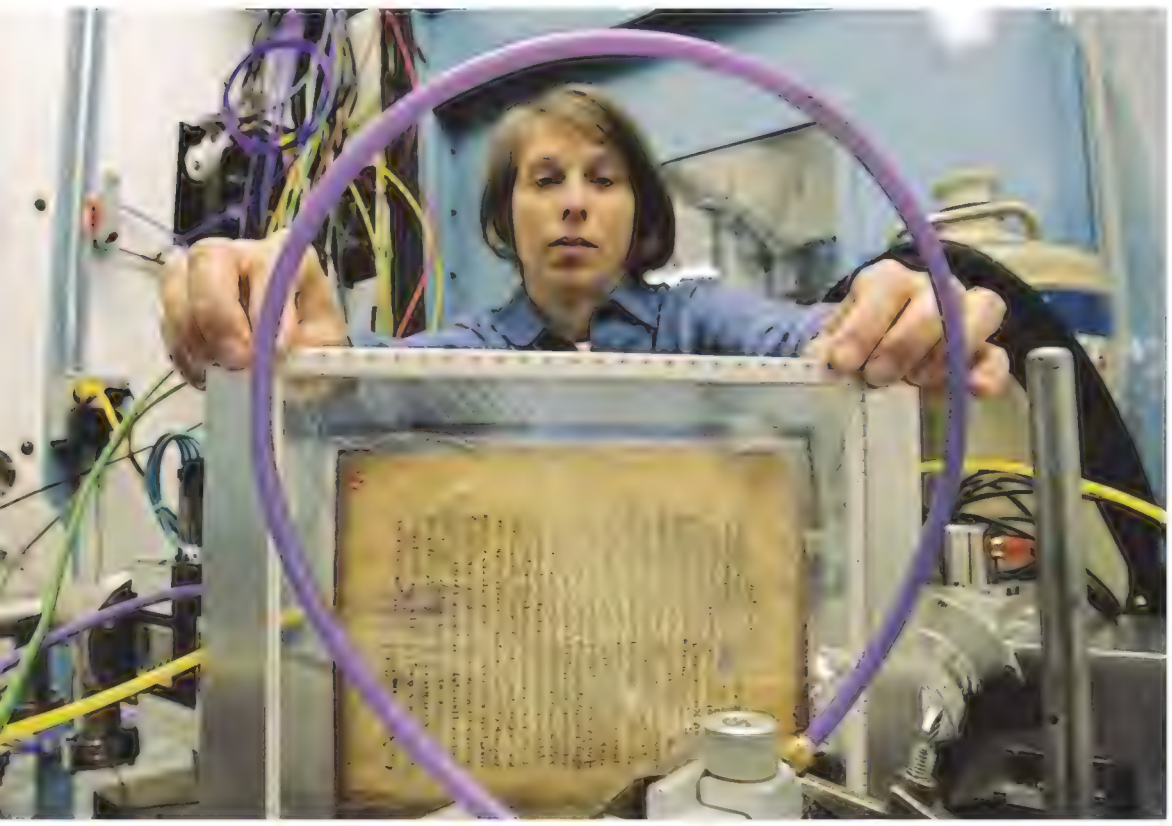
BY MARY K. MILLER



A THIN BEAM OF X-RAYS scans the writings of the legendary Greek scientist and mathematician Archimedes, a hidden text that may be the most important ancient scientific document discovered since the Renaissance. As faint lines emerge on a large computer monitor at Stanford's Synchrotron Radiation Laboratory, I can just barely make out the ghostly image of the Greek letter lambda.

As a Webcast producer for the Exploratorium science museum in San Francisco, I have been documenting this experimental use of one of the most sophisticated tools of modern science, to decipher a 1,000-year-old book made of goatskin. Known as the Archimedes Palimpsest, dubbed Archie for short, it looks terribly fragile. The edges of most of the book's 174 pages are burned, and tears, holes and spots of purple mold dot their surface. The parchment is smaller than I thought it would be, not much larger than a hardback novel.

I want simply to gawk, but the hum of machinery reminds me that I have work to do. Since I've been spending so much time around Archie, the imaging team has given me the job of shift supervisor this afternoon. I check the intensity of the X-ray scanner, note the time, and record the temperature and humidity from the environmental monitors near the document. In its pages is the only known surviving record of two of Archimedes' works, and the only version of another one in the original Greek. In addition, there are 14 pages of rare commentaries on Aristotle's treatise on the logic of categorization and another 10 pages that record two previously unknown speeches of Hyperides, an Athenian orator and politician from the fourth century B.C. Most of these are invisible to the naked eye—they've been obscured by mold, written over by a medieval priest or almost destroyed by a modern forger who didn't recognize, or care about, their true value.



The 1,000-year-old Archimedes Palimpsest (inset) was taken apart, cleaned, stabilized (right, a conservator applies a patch) and analyzed (Abigail Quandt loads a page into an X-ray scanner at Stanford).

ARCHIMEDES MAY BE BEST known for rising from his bath and running naked through the streets of Syracuse, a Greek city-state on what is now the island of Sicily, shouting "Eureka." ("I have found it.") According to legend—and it is more likely legend than fact—the third-century B.C. mathematician had just discovered that he could determine the purity of gold in part by measuring the volume of water it displaces. Archimedes was celebrated in his own time, as well as ours, for his practical applications of mathematics and physics. The screw that he invented still moves water uphill, and the catapults and other weapons he designed defended Syracuse from Roman invaders. (Syracuse eventually fell under the Roman siege, and Archimedes was killed by an enemy soldier at the age of 75—supposedly after drawing geometric figures in the sand and snapping: "Don't disturb my circles!") He also estimated the value of pi. "Archimedes was the greatest mathematician in the ancient world," says William Noel, a curator of ancient manuscripts at the Walters Art Museum in Baltimore and the person most responsible for the care and reading of the palimpsest. "He was the first scientist to apply abstract mathematical principles to the world around him."

Archimedes wrote his treatises on papyrus rolls, the originals of which have been lost. But his works were faithfully copied by generations of scribes and made the leap onto bound goatskin parchment by sometime late in the fifth century, probably in Constantinople. That city's great libraries were sacked by Crusaders in 1204, but one parchment, penned in the 900s, somehow survived and was secreted away to a Christian monastery near Bethlehem. In 1229, a Greek priest who needed parchment for a prayer book took apart the Archimedes manuscript, scraped and washed off the pages and copied liturgical text on top of Archimedes' writings in a process known as palimpsesting (from the Greek word *palimpsestos*, meaning "scraped again"). Horrifying as that seems now, the original text probably would not have survived had the scribe not recycled it and subsequent monks not preserved

CHRISTIE'S IMAGES; PAUL SAKUMA / ASSOCIATED PRESS; PP. 58, 59 & 61 GEORGE STEINMETZ

Sometime after 1938, a forger, perhaps oblivious to the document's historic nature, tried to boost its value by painting Byzantine-style illuminations on a few of its pages (left). Scientists found that underneath the travesty lies part of the only known copy of an Archimedes manuscript (an X-ray image) that was perhaps the first mathematical discussion of infinity.

the prayer book—unaware of what lay beneath the scriptures.

These Archimedes treatises were essentially lost to history until 1906, when a Danish classics scholar, Johan Ludwig Heiberg, discovered the thousand-year-old manuscript in a library in a Greek Orthodox monastery in Constantinople. Heiberg recognized that the faint writings underneath the prayers came from the mind of Archimedes. Heiberg was allowed to photograph many of the pages, and he published scholarly articles on those writings he was able to decipher. But Heiberg couldn't read some pages, and he ignored the diagrams. Then, sometime after World War I, the palimpsest disappeared again, removed from the library under mysterious circumstances—possibly stolen from the monastery—and is believed to have been in the hands of a French family for much of the 20th century. It resurfaced again in 1998, when an anonymous private collector in the United States bought the document at auction for $2 million.

The palimpsest might have remained out of public view—and the hands of scholars—had the Walters Art Museum's Noel not managed to contact the new owner, through the selling agent, and request access to it. To the curator's delighted surprise, the owner (who remains anonymous) personally delivered it to Noel and his colleagues for conservation and study at the Walters.

The palimpsest had deteriorated significantly in the century since Heiberg first examined it in Turkey. Humidity had spurred the growth of mold, and there were even more holes in the pages than before. Worst of all, four of them had been covered with gold-leaf paintings. Apparently, in a misguided attempt to make the book more valuable, a previous owner had used palimpsest pages to forge an illuminated Byzantine manuscript.

Before they could begin deciphering Archie's secrets, the Walters' conservators, led by Abigail Quandt, began the painstaking job of halting the damage. It took four years to take the book apart and clean it. Meanwhile, using ultraviolet light and various techniques to enhance images, scientists from Johns Hopkins University, the Rochester Institute of Technology and other institutions were able to reveal about 80 percent of the manuscript. According to Reviel Netz, a professor of classics at Stanford University, this work added substantially to Heiberg's efforts.

The document's most important treatise is called "The Method of Mechanical Theorems." In it, Archimedes uses the way an object can be balanced to derive its geometrical and physical properties. Even more important is the

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MARY K. MILLER *is a co-author of* Watching Weather *and a writer and Web producer for the Exploratorium in San Francisco.*

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method's description of infinity, a concept long considered too problematic for ancient Greek mathematicians to grasp. Our modern understanding of it was refined by Issac Newton and Gottfried Wilhelm von Leibniz when they independently invented calculus. From the palimpsest, scholars now know that infinity was understood by Archimedes 20 centuries earlier.

Another unique text is the "Stomachion," arguably the first treatise on combinatorics, the branch of mathematics concerned with the organization of elements within sets. In this passage, Archimedes describes a puzzle in which a square is cut into 14 irregular pieces. The puzzle's solution lies in determining the number of ways the pieces can be arranged back into a square. It is not known if Archimedes solved the puzzle—those pages have been lost—but modern mathematicians have determined the answer: 17,152.

NOEL'S WALTERS ART MUSEUM team deciphered most of the palimpsest, but couldn't read through the forger's gold-leaf painting. That's where the Stanford Synchrotron Radiation Lab (SSRL) came into the picture. The lab generates X-rays from powerful beams of electrons that race around a 260-foot-diameter ring in the windowless, doughnut-shaped building at nearly the speed of light. A couple of years ago, while working on an unrelated Exploratorium project, I was getting a tour of the SSRL when Uwe Bergmann, a German-born physicist, stopped my group in the curved hallway. He told us he was working on an experiment that involved exposing inked parchment to the SSRL's X-ray beam. Bergmann had read about the palimpsest in a German magazine and had deduced that the SSRL would be able to image iron in the ink underneath the gold paintings. The experiment Bergmann showed me that day had convinced him that his technique could work on parchment—and he was practically jumping up and down in excitement.

Is the ancient Greek mathematician underappreciated? "Trying to retrieve the mind of Archimedes, scraped off and painted over, is a tall order," says William Noel (at the Walters Art Museum, with X-ray data).

To reveal the hidden ink, X-rays that form a beam no thicker than a human hair strike ink on the parchment. Their energy causes certain elements in the ink to fluoresce, or glow. Detectors pick up each element's distinctive wavelength of fluorescence, and a computer converts the data into computer images. "The X-rays just care about the element on the parchment," says Bergmann. "You can observe the iron in the ink no matter what is above or below it."

In the past two years, SSRL's imaging experiments have provided some exciting new results, including the signature of the scribe who first copied the liturgical texts and the date he did it (Ioannes Myronas, on April 29, 1229).

NOW WE'RE AT THE END of the ten-day run. We've been scanning one of the most difficult pages in the book, the introduction to Archimedes' "Method of Mechanical Theorems," which is covered by a gold-leaf forgery of a seated saint (see p. 62). A diagram on the page contains critical information about how Archimedes thought about geometric proofs, information Heiberg ignored. This is the second run of this page; to extract more faint lines from underneath the painting, the detectors have been tuned to image calcium, rather than iron.

We've already had some success. Stanford's Reviel Netz told us earlier in the week that he was able to see clearly for the first time one of the labels for a drawing that accompanies Archimedes' "Method of Mechanical Theorems." The label, Netz says, decided a long-standing dispute among scholars about what they considered an error in the diagram.

After Stanford, the palimpsest will be hand-carried by conservator Abigail Quandt back to the Walters Art Museum in Baltimore, where it will undergo additional imaging work to reveal more of the text from Hyperides, the Athenian orator, which is expected to contain new information about the foundations of Greek democracy, Athenian law and social history. The team expects to wrap up its work sometime in 2008, then the document will go on display for three months at the Walters and later at other museums. Its text will be published for scholars and students to pore over. "What we've been finding with the Archimedes Palimpsest is that this book never ceases to give up its secrets," says Noel. "It's like working with a great mind; you're made to think of things in new ways—from the nuts and bolts of medieval history to the roots of calculus and physics."

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HELSINKI RISING

The city of Sibelius, known as a center for innovative technology and design, now stakes its claim as an urban hotspot

BY JONATHAN KANDELL

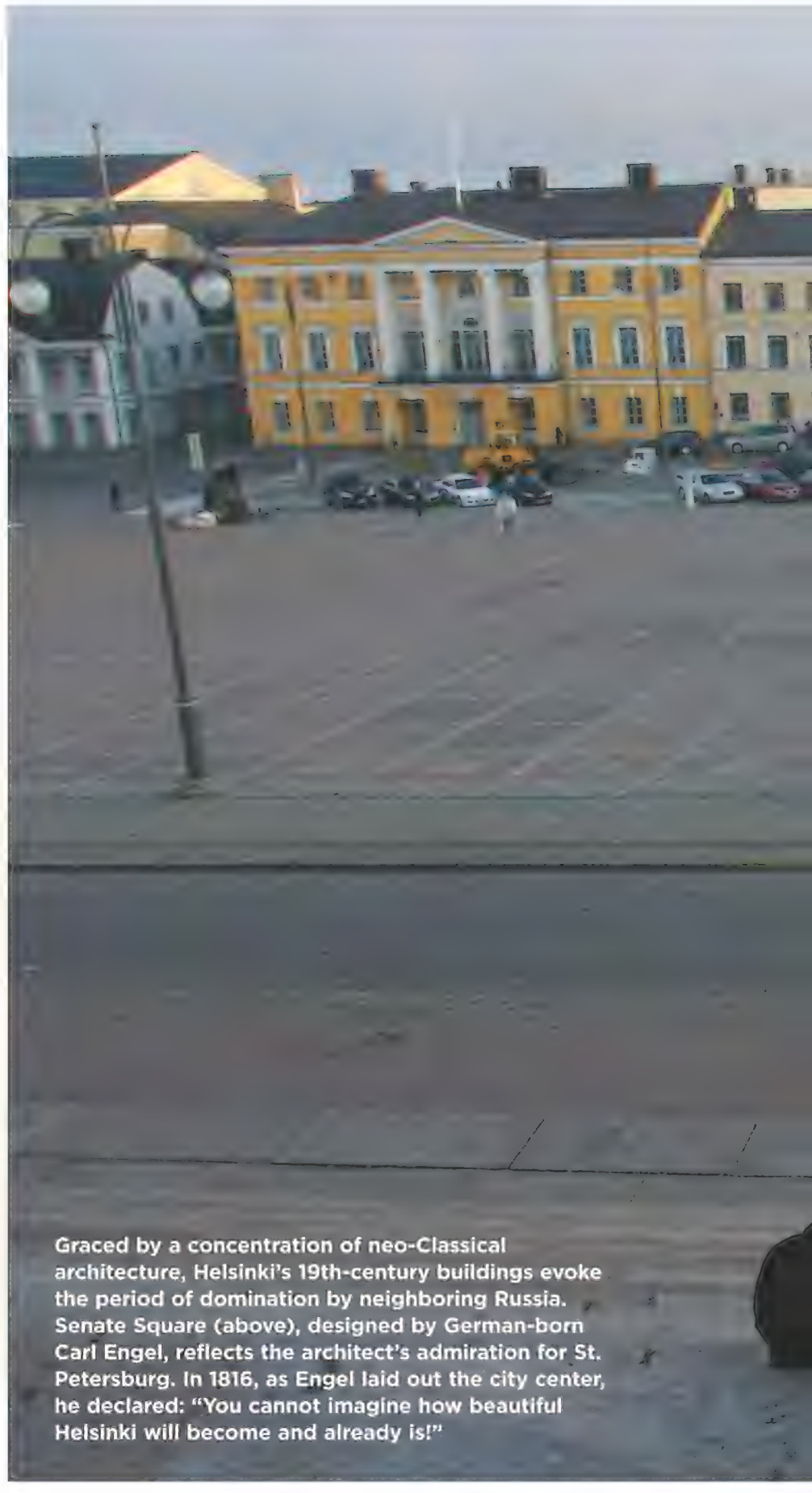
PHOTOGRAPHS BY YORAY LIBERMAN

WHEN THE LONG northern winter finally ends, the Finnish capital of Helsinki returns slowly to life. Deathly pale residents, who look as if they have just emerged from confinement in a cellar, roost on the gray stone steps of Senate Square; students from the University of Helsinki sprawl in the greening grass to soak up the sun; crowds linger by the Baltic Sea harbor, where fishing boats, painted bold red and blue, sell the day's fresh catch, watched closely by gulls wheeling in the salt air. The whole city is bathed in golden light, which brushes the pastel neo-Classical buildings, shimmers on the blue sea and shines on the capital for 20 hours a day, all the more welcome after the months of darkness.

Dour climate and isolation have made the Finns a grim people. That, at least, is the conventional wisdom regarding this nation of 5.3 million. They would have reason enough for melancholia, having endured not only eons of winter but also centuries of dominance by more powerful neighbors—first the Swedes, then the Russians, then the Soviets. (The country declared its independence after the fall of Russia's czar Nicholas II in 1917.) Finns survived all of this by dint of *sisu*, their phrase for stolid perseverance in the face of long odds and frequent disparagement. Even their old capital, of which Finns are justifiably proud, was designed by an outsider, Carl Ludvig Engel, the famed German architect hired in 1816 to rebuild Helsinki when it was hardly more than a town of 4,000.

Now, after years of self-doubt on the sidelines, that capital has grown to 561,000, and the Finns are finally stepping out into the sunlight of modern Europe. They are even showing the way for the rest of the world: Finns were among the first to embrace modern telecommunications, arming themselves with Nokia cellphones, a local product

The Finnish capital, facing the Baltic Sea (residents frequent the quay), enjoys a setting that has long enthralled visitors, including a Frenchman in 1838: "This town stretches over a vast peninsula. . . ," he wrote, "the sea surrounds it on all sides."



Graced by a concentration of neo-Classical architecture, Helsinki's 19th-century buildings evoke the period of domination by neighboring Russia. Senate Square (above), designed by German-born Carl Engel, reflects the architect's admiration for St. Petersburg. In 1816, as Engel laid out the city center, he declared: "You cannot imagine how beautiful Helsinki will become and already is!"

that they unleashed upon the planet, and one that keeps virtually 100 percent of this once-reticent nation chattering away, breaking down the vast distances that characterize their sparsely settled country.

Helsinki's inhabitants have always lived—and thrived—by balancing their urban and bucolic souls. Because parts of the capital are blanketed by woodland and washed by the sea, it is sometimes difficult to distinguish where nature ends and city begins. About three quarters of Finland's 130,500 square miles are thickly forested. The country has some 190,000 lakes, and the coastline crumbles into 95,000 islands. This means that many a Helsinki family has easy access to a summer cottage—usually a modest one, without electricity, but comfortable enough for July and August.

Perhaps as an antidote to the sensation of being overwhelmed and isolated by their natural landscape, Helsinkians have embraced technology more quickly and avidly than people elsewhere. Finland's Nokia, the largest cellular phone manufacturer in the world, introduced wireless phones across the land at a time when most Americans were still using land lines, and the capital's new resi-

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Writer **JONATHAN KANDELL**, *based in New York City, reports often on culture and economics. Photographer* **YORAY LIBERMAN** *lives in Istanbul; this is his first appearance in* SMITHSONIAN.

MAP: MIKE REAGAN, YORAY LIBERMAN / GETTY IMAGES

Finns were among the first to embrace a telecommunications revolution, arming themselves with Nokia cellphones, which they then unleashed on the planet.

dential enclaves come equipped with wireless broadband on the premise that good access makes good neighbors.

More than a century ago, Finland's greatest composer, Jean Sibelius (1865-1957), helped forge his nation's identity by writing music that sought to bring the spirit of the ancient forest into the cosmopolitan salons of the growing capital. At the time, the Finns were about to emerge from centuries of foreign rule—by Sweden (1100s to 1809) and Russia (1809 to 1917).

By age 33, Sibelius had established his reputation as a musical genius with his 1899 tone poem, *Finlandia*; his countrymen immediately embraced the piece, and its composer, with patriotic fervor. But Sibelius had already fallen into a life of partying that was sapping his musical output. A famous 1894 painting by Akseli Gallen-Kallela, ironically titled *Symposium*, depicts Sibelius and some artist pals carousing at the Hotel Kamp's restaurant. This unflattering portrayal scandalized the public. In 1904 the composer decamped for the countryside. "In Helsinki, all song dies in me," he confessed.

He found respite—and inspiration—north of Helsinki in a country retreat named Ainola, after his wife, Aino. She and Sibelius lived out their days there, drawing strength from prolonged immersion in the landscape of dense forests and limpid lakes. Weather permitting, Sibelius spent hours each day walking amid the pines and birches, lingering in farm

Helsinki's residents, whether venturesome (teens text their friends, top) or traditionalist (the sauna remains popular, left), take pride in the spunkily inventive spirit that infuses their city (where even the central train station, right, offers a landmark creation by iconic architect Eliel Saarinen).

fields and finally reaching the shores of nearby Lake Tuusulanjarvi. Dressed in a suit, vest, tie and Borsalino hat, he looked like a gentleman banker. These daily encounters with nature infused his music.

And at Ainola, in a two-story house with whitewashed pine slat walls and a red-tile roof topped by several towering chimneys, Sibelius wrote five of his seven symphonies, scores of tone poems, some 50 piano compositions and dozens of chamber music pieces, usually without the aid of any instruments. "He claimed to have an orchestra in his head," says guide Annikka Malkavaara. Sibelius was so obsessed with the need for silence that he forbade the installation of modern plumbing, fearing that the sounds of running water and knocking pipes would break his powers of concentration.

ACROSS THE GARDENLIKE ESPLANADE from my hotel in Helsinki, the furniture store Artek pays homage to Finland's other cultural giant, the architect and designer Alvar Aalto (1898-1976), who co-founded Artek. Here, the furniture, vases, trays and lamps he designed in the 1930s and '40s continue to sell briskly. Of course Finland has long

Chef Markus Aremo of George, a leading Helsinki restaurant, believes that good Finnish food is simple, pure and close to nature.

YORAY LIBERMAN / GETTY IMAGES (ALL)

been known for its world-class design: boldly colored Marimekko fabrics have been popular for decades. More recently, about an hour's car ride west of Helsinki, the village of Fiskars (birthplace of the popular scissors of the same name) has gathered a hundred artists, ceramists, woodworkers and graphic and industrial designers in a decade-old cooperative whose creativity is probably unmatched throughout Europe. But Aalto, the exponent of clean-lined modernism, is still considered the fountainhead of Finnish design. Even cooks claim to be inspired by him. When I ask Markus Aremo, the 37-year-old chef at George, a leading Helsinki restaurant, what made his reindeer fillet in red-wine sauce and puréed cabbage so irresistible, he replies: "Good Finnish food imitates Aalto—simple, pure, and close to nature."

Glitzy restaurants (such as Teatteri, above) abound. The late R. W. Apple Jr., writing from Helsinki this past summer, reported rapturously on local cuisine in the *New York Times* and quipped: "The leaders of larger [European] countries have taken to demeaning Finnish food. . . . What are those guys smoking?"

Finns often describe Aalto as the emotional opposite of the romantic, brooding Sibelius. Yet he shared many of the composer's motivations. He, too, viewed his art as an expression of Finnish nationalism and claimed to be inspired by nature. And like Sibelius, he had an ambiguous relationship with Helsinki, choosing to live just beyond it.

Aalto's most famous architectural work, Finlandia Hall, a concert auditorium, was completed in Helsinki in 1971, only five years before his death at age 78. Aalto always resented the prominence given to Senate Square because it was built by Engel, who was German, when Finland was still under Russian rule. Aalto thought that independent Finland should construct a central square of its own—something he never got around to doing, but his Finlandia Hall stands as a fitting memorial, as stunning as any building in the capital. Encased in white marble and black granite, it evokes a tower with a graceful roof that swoops upward over the entire structure.

Like most Aalto enthusiasts, I had visited Finlandia Hall numerous times, but never made my way to the architect's house, a boxlike residence on the northern edge of the city. Built in 1936, the house was sheathed in wood and white painted brick, with a modest entrance near the garage. Aalto intentionally built it on wooded land. "You should not be able to go from home to work without passing through a forest," he once said. But the neighborhood was soon engulfed by a spreading capital. The studio, where Aalto worked with as many as 15 collaborators around three

Composer Jean Sibelius (above left, and as depicted in an 1894 painting at the Hotel Kamp) feared that Helsinki's night life would undo him. Hence his departure for a country house (now a museum, right) 25 miles north of Helsinki. In the rural silence, he said, he could hear "a symphony in his head."

tables, has a ceiling that rises 16 feet. A few brick steps up from the studio, Aalto's own small office is perched on a split level. In a corner of this room, a wooden ladder leads up to the narrowest of doors that opens to the roof terrace. "It's an example of Aalto's humor," says Sade Oksala, who guides me through the house. "He could do a disappearing act if he didn't want to be bothered by his associates or by an unwanted business visitor."

A sliding door separates the studio from the living room and the furniture he designed for it. My favorite piece is a sinuous wooden easy chair from the 1930s. Aalto claimed its signature simple lines and curves were inspired by the forests and lakes in central Finland, where he spent his childhood. The most incongruous piece in the room is a black-upholstered Chesterfield armchair from the 1920s. According to Oksala, the designer loved its comfort. "He bought it with his very first paycheck," the guide says.

Although Helsinki society is thoroughly secular, friends urged me to spend a Sunday morning observing one of the more significant religious occasions in the city—the investiture of novice ministers at the Lutheran Cathedral that dominates Senate Square. The turquoise-domed cathedral, its exterior grandiose with cupolas and white Corinthian columns, is stark white inside, except for the gilded altarpiece. With music from the monumental organ rising to a crescendo, a young novice kneels, and the bishop places his hands over her head in the climactic moment of the ceremony. But the drama is suddenly marred by the unmistakable strains of "Home on the Range" coming from the handbag of the woman sitting next to me. She quickly shuts off her cellphone—a Nokia, naturally.

Almost every Finn owns a cellphone. "I can think of no other developed country where one company has so much impact on the economy as Nokia has on Finland's," says Pekka Yla-Anttila, research director at Helsinki's Research Institute of the Finnish Economy. Nokia accounts for almost 3 percent of the gross domestic product and one out of every five dollars that Finland earns abroad. It's one of Finland's biggest employers, with nearly half of its 23,400 workers living in the metropolitan Helsinki area. When Nokia's chief executives suggest that taxes are too high or that local universities aren't graduating enough engineers, the authorities pay attention.

BETTMAN / CORBIS; PRIVATE COLLECTION, HELSINKI, CENTRAL ART ARCHIVES; THE GRANGER COLLECTION, NY (2); HARRI AHOLA.

The local media give the newest Nokia products the kind of coverage reserved elsewhere for entertainment and sports. At the company's glass-and-steel headquarters in Espoo, a city west of Helsinki, Damian Stathonikos, 34, a Canadian-born executive, shows me around; he is a reminder that Finland still imports some of its talent. Stathonikos demonstrates a phone that takes photographs and videos with the resolution of a high-end digital camera, and features Wi-Fi connectivity and GPS; another downloads and plays music with the quality of a nightclub stereo system. Each is priced at about $800.

"Our first market for these devices is what we call the 'early adopters'—18- to 35-year-old males with high disposable incomes who just have to have the latest gadget," says Stathonikos. "Afterward, when prices drop, come the 'eager followers'—people like myself who have a family and don't have as much time and money to spend on the newest gadgets, but don't want to settle for a product that Dad is going to buy."

Finns generally consider themselves people of few words. But cellphones have banished the silence that once prevailed in Helsinki restaurants, buses and other public places. Nokia public relations executive Maria Kellokumpu waited until her son, Pietari, was 10 before buying him a cellphone. But her daughter, Venla, got her first Nokia at age 9 because all of her classmates had acquired them. "Now it seems that kids get a cellphone as soon as they start school," says Kellokumpu.

Perhaps the only Nokia-free environment in all Helsinki is the sauna. For thousands of years, Finns and their forebears have relished sweating in a blazing-hot hut and then plunging into cold water. Nowadays, Finns have about two million saunas, many of them right next to their home bathrooms. Finns of all ages visit saunas, but except for families, men and women do not ordinarily bathe together.

The Finnish Sauna Society, a 70-year-old private club in western Helsinki, sits at the end of a winding road on a forested peninsula jutting into the Baltic Sea. Waiting at the entrance stands Dr. Lasse Viinikka, president of the society for the past 16 years. Tall, burly and affable, Viinikka, 58, spends his non-sauna hours as director of the University of Helsinki's hospital laboratory. He suggests that I hold any questions until we've sweated a bit. We join a dozen other naked men sprawled or seated on three levels of the main sauna. There is a trace of fragrant smoke from the wood embers used for heating the room to what feels like near boiling temperatures. After about 15 minutes, we take a break. Viinikka walks down to a jetty on the Baltic and plunges into the 60-degree water, while I opt for a tepid shower.

Two sauna sessions later, we move into the "social room" for beer and open-faced herring-and-egg sandwiches. "Some people believe that sauna began as a prehistoric ritual to celebrate a successful hunt," says Viinikka. Can sauna reduce high blood pressure and tension? Is it good for the lungs and kidneys? Does it clean out pores and rejuvenate the skin? "There really is very little medical evidence to support whether or not sauna is good for the health," he answers, to my surprise. "Most important, sauna feels good—and it is a great way to socialize with friends."

Architect and designer Alvar Aalto (1945, left) imposed a distinctively Finnish take on modernism. After his Finlandia Hall (right) opened in Helsinki in 1971, *New York Times* architecture critic Ada Louise Huxtable described it as "a painstakingly beautiful, contemporary design in the highest creative sense."

WHEN THE WEATHER turns warm, Helsinki's inhabitants stream to the dozens of islands in the city's archipelago. None are more historic than the cluster where Suomenlinna, a giant fortress—at the time, the largest

construction project in the Nordic region—was built in the mid-1700s to discourage invaders. Its ruins are maintained by some 75 convicts living there in a minimum security prison. As recently as the 1960s, Finland had one of the highest incarceration rates in Europe. Now it has one of the lowest, with 3,572 inmates, or about 67 for every 100,000 inhabitants—compared with more than ten times that in the United States. "The simplest answer for the decline in our inmate population is that nowadays we use prison sentences much less than most other European countries or the U.S.," says Tapio Lappi-Seppala, director of the National Research Institute of Legal Policy in Finland. "We prefer other alternatives, like community service and fines."

I SPEND MY FINAL DAY at the spot where Helsinki was founded in 1550, on the eastern shore of the Baltic a couple of miles north of the present harbor. The neighborhood, known as Arabianranta, or Shores of Araby (a name conferred in the 1500s, when the location was considered remote from Helsinki), contains the Arabia ceramics factory that has operated here since the late 1800s. Arabianranta, an emerging center for design, is today the most high-tech residential and office complex in Finland. With 6,000 inhabitants and an equal number of employees, the wireless interactive neighborhood will likely increase its population to 10,000 by 2010.

A resident contemplating moving into Arabianranta might be shown a computerized facsimile of an apartment model, with outer walls as the only permanent structures. On-screen, the prospective buyer can choose up to 2,500 ways to customize the apartment even before construction gets under way. "It can drive a developer crazy," concedes Kari Raina, 47, the managing director of Arabianranta's development corporation. Each apartment comes equipped with super-broadband connections for television programs transmitted from around the world and hookups for those who wish to work at home and telecommute. Little wonder that architects, industrial designers and media people gravitate to Arabianranta's small, hip companies.

Each apartment building in Arabianranta has its own "e-moderator," a volunteer in charge of the building's Web site, which keeps residents informed of neighborhood activities, the arrival of new occupants, last-minute availability for a family at the communal sauna, and anything else that affects their building. Kaj Lindback, a 34-year-old former owner of a Web site design company, was acting as e-moderator for his 70-unit apartment building the day I visited. "A lot of residents use the Web site mainly as a chat box to get to know each other," he says. But he also keeps up with neighborhood gossip the old-fashioned way, as co-owner of a local bar where he chats up patrons.

Islands off Helsinki's harbor hold a 1700s fortress (left) and an innovative minimum security prison. A residential-office complex, Arabianranta (right) offers a new kind of neighborhood, connected by a wireless network. A willingness to experiment may explain the city's passionate embrace of the future.

For most who live in Arabianranta the chief attraction is its location on a Baltic inlet. The shore is lined with a pathway for joggers, cyclists and cross-country skiers that circles Helsinki. Across the water a nature reserve is alive with swans and cranes, just as it must have been four and a half centuries ago, when the foundations of the city were laid on the mainland.

To me, the scene offers a metaphor of modern Helsinki. I doubt any other urban residents have succeeded as well in striking a balance between the demands of city life, the virtual reality of the computer age and a profound attachment to the natural landscape that has shaped their sensibilities for so long.

YORAY LIBERMAN / GETTY IMAGES (2)

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PHOTOGRAPHS BY ANDREA PISTOLESI

Pistolesi says he had to dodge a warden to take a full panorama, with its eerie effects, at Paris' Place des Vosges.

ANDREA PISTOLESI is quick to admit there's something odd about these photographs. "You look in front of and behind yourself at the same time," says the 50-year-old Florentine photographer. "It's not very normal." Indeed, his 360-degree panoramic images of European city squares are full of fun house absurdities: buildings bend, fountains loom and the same figure may appear in the same photograph more than once. But those effects aren't the point, Pistolesi says: "You have the opportunity to put all the elements that make a space unique into one single picture."

Pistolesi makes the panoramas by rotating a camera atop a tripod and taking about 12 exposures in quick succession. (One shy bystander elected to circle around behind the turning camera to avoid being photographed.) A computer program stitches the pictures together, slightly distorting each one to create a single image with a dozen points of view. In a way, the form suits the content. The European city square itself, always a site for social and political gatherings, welcomes multiple points of view. Pistolesi, who has photographed in some 70 countries and published 50 books of photography, calls the city square "very European as a concept."

In Paris, Pistolesi says he had to dodge a nosy warden in the Place des Vosges in order to get his shot, a view of the City of Light that is at once classic and eerily different. In Lisbon, he worried that his images wouldn't stitch well because of the elaborate mosaic-like patterns of the paving stones. But the images did mesh, and he discovered a logic in the design more profound than he'd noticed with the naked eye. Each panorama presents a space "that *is* there," Pistolesi says, "but you'd never see it like that." —DAVID ZAX

Additional photos on the next page

In Lisbon's Rossio Square, Pistolesi's computer-aided stitching together of 12 distinct images yields one, he says, that is "like a painting."

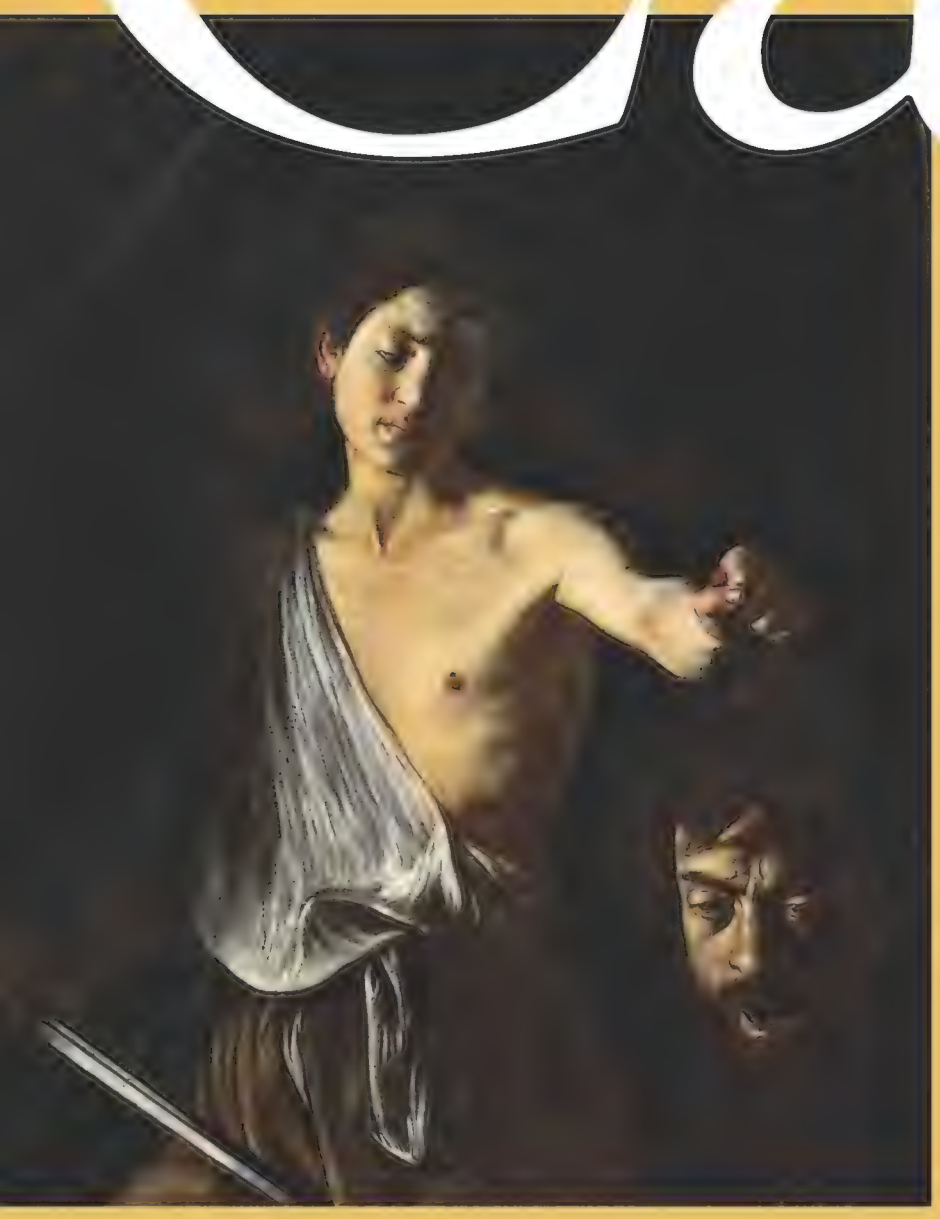
Maquill
Ofici
CIBE
PORQUE TÚ LO VALES

Pistolesi's unusual perspective turns two canals into three in Cannaregio, one of Venice's less-frequented districts.

The more you try to understand a picture (Theaterplatz, Dresden), the more confused you may get, Pistolesi says.

"It's like Grand Central Station," Pistolesi says of bustling Puerta del Sol, a centuries-old square in central Madrid.

ON THE TRAIL OF Caravaggio



The works of the criminally gifted 16th-century painter are attracting passionate, even cultish, admirers. A noted novelist makes her own pilgrimage through Italy in search of the master turned murderer

BY FRANCINE PROSE **PHOTOGRAPHS BY ANDREA PISTOLESI**

Caravaggio painted *David with the Head of Goliath* (above) in 1609 during his final stay in Naples. It was likely meant for one of the influential Romans lobbying the pope to pardon the artist, who is said to have depicted his own features on Goliath's face.

SCALA / ART RESOURCE, NY

aggio

Campo Marzio, Rome - Caravaggio lived and worked in this district, then noted for its taverns, brothels and rough-and-tumble street life, after arriving in Rome in the fall of 1592.

AMONG THE MYSTERIES surrounding the turbulent life and the dramatic career of Michelangelo Merisi da Caravaggio is how this brilliant Baroque painter of powerfully moving religious scenes and sensual visions of earthly delight could have fallen into disfavor and obscurity for more than three centuries after his death in 1610. How could the most casual tourists or the most pious supplicants have seen his work in Rome's Contarelli or Cerasi chapels and not noticed that they were in the presence of genius? But in fact Caravaggio, though celebrated and financially successful in his own time, was despised by later artists such as Nicolas Poussin, scorned by critics (among them eminent British writer John Ruskin) and nearly unknown to the general public until 1951, when a landmark exhibition in Milan, curated by the respected Italian art historian Roberto Longhi, restored him to his rightful place in art history.

Longhi's rescue effort has proved to be an enduring one. Today, in every season and regardless of how early or late in the day one goes, those same chapels are crowded not only with travelers encountering Caravaggio for the first time but, just as often, with ardent devotees who have come to Rome specifically to look at his work. Indeed, over the past decade or so, this notoriously mercurial and troubled artist has gained such a passionate following that if you spend long enough in front of one of his paintings, you're bound to meet someone who has journeyed a considerable distance to see it.

So, several years ago as the winter morning light filtered into Rome's Church of Sant' Agostino, where I had gone directly from the plane to look at *The Madonna of Loreto* (opposite), I met a passenger from the same flight, an American accountant, who had also headed straight for the Caravaggio. Not long after, at a dinner in Manhattan, I sat beside a distinguished research scientist who keeps a list of all the known Caravaggios beside his phone; whenever he is invited to attend a conference, he checks the list, and his acceptance often hinges on the meeting's proximity to a work he has not yet seen. More recently, after giving a museum talk about Caravaggio, I met dozens of art lovers who had adopted the tormented Baroque master as their unlikely tour guide. They'd followed a sort of Caravaggio trail, visiting the places where he lived, and looking at his paintings, which themselves have been traveling widely, as a series of Caravaggio exhibitions—including the Van Gogh Museum's magnificent "Rembrandt-Caravaggio" show last year—have at once responded to, and furthered, the artist's popularity and his international reputation.

CARAVAGGIO AND ROME

STRICTLY SPEAKING, the proper Caravaggio tour should begin in Caravaggio, the small town outside Milan where Michelangelo Merisi was born, most likely in 1571, the son of a builder, Fermo di Bernardino Merisi, employed by the illustrious Sforza and Colonna families. After the death of her husband in 1577, Caravaggio's mother, Lucia Aratori, raised Michelangelo and his three siblings with the help of her father. Caravaggio is thought to have received the basics of a formal education, but he appears to

A must stop in Rome for the Caravaggio pilgrim is the Church of Santa Maria del Popolo (opposite), at one end of the busy Piazza del Popolo. Two of the artist's major religious works—*The Crucifixion of St. Peter* (opposite, left), painted c. 1600, and *The Conversion of St. Paul*—are in the church. After fleeing Rome to avoid arrest for murder, the artist spent four years in exile, traveling from the Alban Hills to Naples, Malta and Sicily.

MIKE REAGAN; P. 83 TOP LEFT: SCALA / ART RESOURCE, NY; TOP RIGHT: ELECTA / AKG-IMAGES

The bold naturalism of Caravaggio's works was revolutionary. He used ordinary people as models for saints and peasants alike in such works as *The Crucifixion of St. Peter* (above, left) and *The Madonna of Loreto* (right); note the Virgin's and pilgrims' bare feet.

Piazza del Popolo, Rome – Caravaggio likely entered the city in 1592 through the Porta del Popolo, at the edge of the piazza.

On the night of May 28, 1606, in Rome's Piazza di San Lorenzo in Lucina (above, left), Caravaggio killed Ranuccio Tomassoni in a knife fight thought to have been provoked by a wager on a tennis match held at a court off the Via della Scrofa (above, right).

BOTTOM: ALINARI / ART RESOURCE, NY

have had no interest in writing—unlike, say, Leonardo da Vinci, who composed learned treatises, or Michelangelo Buonarroti, who left a body of written work that ranges from poems to grocery lists. Not a single letter, drawing or preparatory sketch by Caravaggio has ever been found. He wrote nothing about himself, certainly nothing about his childhood, and his adult life seems to have included no one who knew him as a boy.

Indeed, so little is known about the artist's early years and education (in 1584, at age 13, he was taken on as an apprentice in the Milan studio of Simone Peterzano, a former pupil of Titian's and a painter of religious scenes) that the Caravaggio pilgrim might more profitably choose to pick up the painter's trail in Rome, where the novice artist arrived in 1592 at age 21, determined to make his mark in a city experiencing a period of urban renewal and revitalization. New churches were being constructed and old *palazzi* refurbished—a combination of circumstances that opened a wide window of opportunity for the ambitious and talented young artist.

In Rome, without venturing far from the historical center, you can (especially if you are willing to dodge the murderous traffic on the Corso Vittorio Emanuele and even more lethal *motorini* darting through the so-called pedestrian zone) trace the arc of Caravaggio's glorious and tragically curtailed career in the capital, a meteoric trajectory that led from poverty to fame and riches and then to crime, murder and exile. You might begin at the edge of the Piazza del Popolo, at the Porta del Popolo, which was, in Caravaggio's day, the principal gateway into the city from the north and, in all probability, the route that the young painter took into Rome. From there you can proceed to the Palazzo Colonna, where Caravaggio stayed briefly with a Monsignor Pandolfo Pucci, a steward to the sister of Pope Sixtus V, who forced the proud young artist to make knockoffs of devotional paintings and fed him so poorly that Caravaggio would refer to Pucci as Monsignor Insalata.

After his unsatisfactory sojourn with Monsignor Insalata, Caravaggio briefly supported himself by making pictures to sell on the street. He soon found employment painting flowers and fruit in the bustling studio of Giuseppe Cesari, later

One of the artist's first religious works, *The Rest on the Flight into Egypt* (left) was painted in the 1590s and possibly commissioned by Cardinal Francesco Maria Del Monte, Caravaggio's most important patron. In the fall of 1595, the painter had moved into the cardinal's mansion, the Palazzo Madama (right), now home to the Italian Senate. Caravaggio painted *The Lute Player* (top) in 1596.

TOP: SCALA / ART RESOURCE, NY

known as the Cavaliere d'Arpino. While working for Cesari, Caravaggio became involved in the rough-and-tumble street life of the now-stylish Campo Marzio, which—with its elegant restaurants and handsome government buildings patrolled by *carabinieri* who always seem a few years too young for the machine guns they're holding—shows little sign of the seedy brothels, taverns and alleys through which Caravaggio swaggered, caroused and encountered the prostitutes, gamblers, ordinary laborers and beggars that he would cast (so shockingly, to his contemporaries) as saints and witnesses in his most spiritual paintings. Nor, for that matter, do the boutiques and gourmet groceries of the Via della Scrofa suggest that this is the place where in May 1606 Caravaggio became embroiled in the ultimately disastrous dispute that allegedly began over a wager on a tennis match. Today, the Piazza di San Lorenzo in Lucina—where, on the night of May 28, the feud that had begun near the tennis courts erupted into a street fight during which Caravaggio stabbed and killed a man named Ranuccio Tomassoni—is most often filled with children and their nannies taking the sun and enjoying the gelato (some of the best in Rome) at Ciampini.

MUCH OF WHAT IS KNOWN about Caravaggio's life comes to us through police records and legal depositions. During his time in Rome, he insulted his fellow painters, quarreled, fought, broke the law, defied the police and was subsequently imprisoned. He was sued for libel, arrested for carrying a weapon without a license, prosecuted for tossing a plate of artichokes in a waiter's face. He was accused of throwing stones at the police, attacking the house of two women, harassing a former landlady and wounding a prison guard.

But evidently his eruptive anger was never directed at the influential aristocrats and ecclesiastical authorities who furthered his career. Heading toward the Tiber from the Campo Marzio, you can pass the Palazzo Madama, now the home of the Italian Senate, where Caravaggio lived for several years in the household of his first, most loyal and important patron, the Cardinal Francesco Maria Del Monte. An avid art collector, music lover and adviser to Ferdinando de' Medici, Del Monte bought two of Caravaggio's canvases, *The Gypsy Fortune Teller* and *The Cardsharps*, then supported him while he painted the dewily sensual, lush-lipped and seductive young men who populate such early masterpieces as *The Musicians* and *The Lute Player*.

As the Caravaggio pilgrim traces the artist's erratic path through the city where he led a sort of double life spanning low and high society, it soon becomes clear that even the intense drama of the artist's biography rather pales beside the vibrancy and high-wire theatrics of his paintings. Because, finally, what continues to draw us to Caravaggio is not so much his near-mythic reputation as a street thug and criminal but rather his work, which of course is the real reason to embark on the Caravaggio tour.

If I had just two hours in Rome, I'd begin in the Contarelli Chapel of the Church of San Luigi dei Francesi, plugging coins in the meter that illuminates the dazzling St. Matthew cycle. *The Calling of St. Matthew* (far right), one of Caravaggio's best-known works, shows Matthew in the customhouse at the moment at which Jesus appears and, pointing his finger, changes Matthew's life forever. Across the chapel is the roiling scene of Matthew's murder at the hands of an assassin who, naked but for a loincloth, has risen from the crowd to grasp the falling saint's wrist and lock him in a gaze that darkly mirrors the fixity of the look that Matthew exchanges with Jesus in the earlier painting. Meanwhile, in the background a cloaked figure provides one of several self-portraits that Caravaggio included in his paintings, most often picturing himself as a witness at some violent or tragic event. Next I'd stop at the nearby Church of Sant' Agostino, as I have before, to see *The Madonna of Loreto*—the gorgeous depiction of the Virgin and her small child coming to the door to greet two pilgrims, whose bare, dirty feet attest to the length and hardship of their journey.

I'd pass my second Roman hour in the Cerasi Chapel in Santa Maria del Popolo, where the cacophony of the Piazza del Popolo fades the moment you enter the church doors. Like the Contarelli Chapel paintings, *The Crucifixion of St. Peter* and *The Conversion of St. Paul* focus on specific moments and recast events from the lives of the saints with naturalistic and highly individualized figures posed against shadowy, theatrically lit backgrounds. In the former painting, Caravaggio portrays the moment that marks the beginning of the saint's agony. Already the old man's suffering—he strains to lift his head off the inverted cross—is heartbreaking, but what makes the painting so unusual and so typical of Caravaggio is his fascination with the burly bodies of the men who are struggling to lift the cross. On the opposite wall, Caravaggio has reimagined Saul's transformation into Paul as a night scene in which the saint writhes on the ground, his arms thrown open, blinded by a moment of illumination witnessed only by a muscular, exhausted-looking horse and a melancholy groom.

Of course, the traveler with more than two hours to spend in the Eternal City can follow the Caravaggio trail to some of Rome's leading and lesser-known (but no less rewarding) museums. In the permanent collection of the Galleria Borghese are *David with the Head of Goliath* (p. 80), a deeply affecting late work and another of the canvases in which the artist himself makes a cameo appearance, this time in the portrait of the dead, defeated giant. The Borghese also owns one of Caravaggio's frankly homoerotic portrayals of the young St. John the Baptist as well as *The Madonna of the Palafrenieri*, a representation of the Madonna and Child with St. Anne, in which Christ appears as a boy

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FRANCINE PROSE's *biography* Caravaggio: Painter of Miracles *appeared in 2005. Her latest book is* Reading Like a Writer. *See more photographs by* **ANDREA PISTOLESI** *starting on page 76.*

P. 87 TOP: SCALA / ART RESOURCE, NY

of around 7 stepping on a serpent that symbolizes evil. This canvas was commissioned to adorn a chapel in St. Peter's Basilica and then rejected because of the extreme and (even today) startling realism with which the nude Christ child is depicted. The remarkable *Entombment of Christ* can be seen in the Vatican Pinacoteca; *Narcissus*, *St. Francis* and *Judith Beheading Holofernes* are in the Palazzo Barberini; yet another *St. John the Baptist* and *The Gypsy Fortune Teller* can be found in the Capitoline Museum. Two of Caravaggio's most tender and meditative works, *Mary Magdalene* and *The Rest on the Flight into Egypt*, are in one of Rome's least-visited and most intriguing museums, the Galleria Doria Pamphilj, where the paintings are hung salon-style, in crowded, seem-

Caravaggio's dazzling St. Matthew cycle was painted for the Church of San Luigi dei Francesi (below). *The Calling of St. Matthew* (right), daringly cast as a contemporary scene, shows Matthew just as Jesus appears at the customhouse and, pointing his finger, changes Matthew's life forever.

San Luigi dei Francesi, Rome - If I had just two hours in Rome, I'd begin in the Contarelli Chapel, plugging coins in the meter illuminating the St. Matthew cycle.

ingly haphazard arrangements, and where, on a late winter afternoon, you may find yourself alone in the palace, lit by chandeliers, contemplating Caravaggio's vision of the Holy Family pausing in their arduous journey to hear a violin serenade played by a delicate and thoroughly charming adolescent angel.

A few days after Caravaggio murdered Ranuccio Tomassoni (as soon as the wounds he'd sustained in the fight had healed), the painter left Rome. And the modern pilgrim following in his footsteps might travel much as he did for the last four years of his life: moving rapidly, covering long distances, arriving at a series of destinations, eventually moving on. Experiencing the strains (as well as the pleasures) of travel makes it seem all that much more remarkable that Caravaggio kept painting at the highest level the entire time he was in flight.

in a nocturnal streetscape, the altarpiece may make you feel as if the cyclonic street life of the city has somehow followed you inside the church. Indeed, the relationship between Caravaggio and the atmosphere of Naples (which can make Rome appear quiet and orderly) seems so complex and syn-

Caravaggio painted *The Flagellation of Christ* (left) in 1607 for the chapel in the courtyard of Naples' San Domenico monastery. His *Seven Acts of Mercy* was executed for the Church of Pio Monte della Misericordia, not far from the Via dei Tribunali (below).

NAPLES

TO AVOID ARREST, the injured artist fled to the pleasant Alban Hills, not far from Rome, where he recuperated under the protection of the Colonna family. When autumn came, he headed south to Naples, where he was courted by the Neapolitan aristocracy and welcomed by the local painters. Soon after his arrival, he executed an altarpiece for the Church of Pio Monte della Misericordia, a painting that would depict the Seven Acts of Mercy: clothing the naked, visiting the ill and imprisoned, giving food to the hungry and drink to the thirsty, sheltering the traveler and burying the dead.

The Church of Pio Monte della Misericordia is in the midst of the frenetic (to say the least) and colorful historical center, on one of the most heavily trafficked blocks of the ancient road that has become the Via dei Tribunali (right). Looking up the dark, narrow, perpetually thrumming Via dei Tribunali, it's easier than it is in Rome to imagine yourself back in Caravaggio's time, in the city where Caravaggio found refuge, and which he managed to translate onto the canvas of *The Seven Acts of Mercy*. With its teeming composition set

Caravaggio, who became a Knight of Malta in 1608, painted *The Beheading of St. John the Bapist* (above) for the Oratory of the Co-Cathedral of St. John in Valletta, Malta's capital. It was at the altar of this very same church that Caravaggio's knighthood was stripped from him after only four months.

ergistic that looking at Caravaggio's paintings makes you see the city in a new way—and vice versa. The heavy blacks that appear so frequently in his late works make a different kind of sense after you've experienced the city's inky shadows, and the drapery that floats near the top of some of his canvases begins to remind you of the laundry strung across its narrow alleys.

Caravaggio thrived in Naples. It was there that he painted his extraordinary version of *The Flagellation of Christ* (opposite, top), which hangs in the Capodimonte museum, housed in an 18th-century palace in the center of the city. It's one of Caravaggio's most beautiful and saddest paintings. Naples' shadows have changed him. His blacks have never been blacker. Much of the canvas is given over to dark and empty space. The drama is transpiring in a grim Neapolitan dungeon in which there is nothing but the column to which Christ is tied; light shines from his pale chest. The glories of the painting itself are enhanced by the fact that the Capodimonte (where you can also see Titians and Bruegels, Correggios and Carraccis) has lit and hung the painting so beautifully that you feel you are actually seeing the light Caravaggio tried to capture on canvas.

MALTA

HOWEVER WELCOMING NAPLES WAS, however beneficial to his work, Caravaggio didn't stay long. In the summer of 1607, he left Naples for Malta. And thus began the pattern that would characterize his final three years. Wherever he went, his work earned him not only intense (both positive and negative) attention but increasingly high fees. As he traveled, presumably awaiting the pardon from the pope that might let him return to the capital without being arrested, he found a way of supporting himself and practicing his art away from the patrons and the intrigues of Rome. He believed he was being followed, possibly by representatives of the pope, and he slept with a dagger beneath his pillow. And inevitably, something would go wrong, compelling him to keep moving.

In Valletta, Malta's capital, he was hired to paint *The Beheading of St. John the Baptist* (above) for the Oratory of the Co-Cathedral of St. John. The composition of this massive painting marks a new approach characteristic of his last religious works: depictions of miracles, or of their preludes or aftermaths, transpiring in what appears to be the depths of an abyss. In these works, the figures are crowded into the lower half of the painting, beneath a crushing expanse of space that makes the drama seem even darker and more tragic.

Around this time, Caravaggio managed to have himself

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Castel Sant' Angelo, Malta – After a scuffle with a fellow knight in September 1608, Caravaggio was imprisoned in the purportedly inescapable fortress.

appointed a Knight of Malta—not an easy task, since the honor was reserved mostly for sons of the aristocracy. His knighthood may have had something to do with the portrait he did of the Grand Master of the Knights of Malta, Alof de Wignacourt, a mysterious and complex rendering of the sitter's personality. But again, despite his new status and his powerful patron, the artist's situation took a sudden turn for the worse. Caravaggio insulted a fellow knight, a serious offense, and he was subsequently imprisoned in the notoriously escape-proof Castel Sant' Angelo fortress.

SICILY

Caravaggio, however, was able to escape, apparently by scaling the walls of the fortress with a rope and sailing out of the harbor on a waiting boat, furnished perhaps by Wignacourt or another supporter. Pursued, he believed, not only by the pope's men but now also by a posse of vengeful Maltese knights, he fled to Sicily—first to Syracuse, where the pilgrim can depart briefly from the Caravaggio trail to visit the city's spectacular Greek archaeological sites and to wander among the Baroque palazzi of the Old City on the island of Ortygia, at the eastern end of the city. In fact, there is evidence that Caravaggio himself was taken by the famous archaeologist Vincenzo Mirabella to view the quarries that border on the beautifully preserved Greek amphitheater at the western edge of the city. These stone caverns were said to have been used as prisons by the Greek tyrant Dionysius the Elder. One of them has unusual acoustical properties: if someone whispers in one corner, it can be heard clearly on the cavern's far side. Caravaggio, who had spent enough time in prison, and had plenty of experience with paranoia and with the fear of being overheard, christened it the Ear of Dionysius, a name that immediately spread, and by which the cave is still known today.

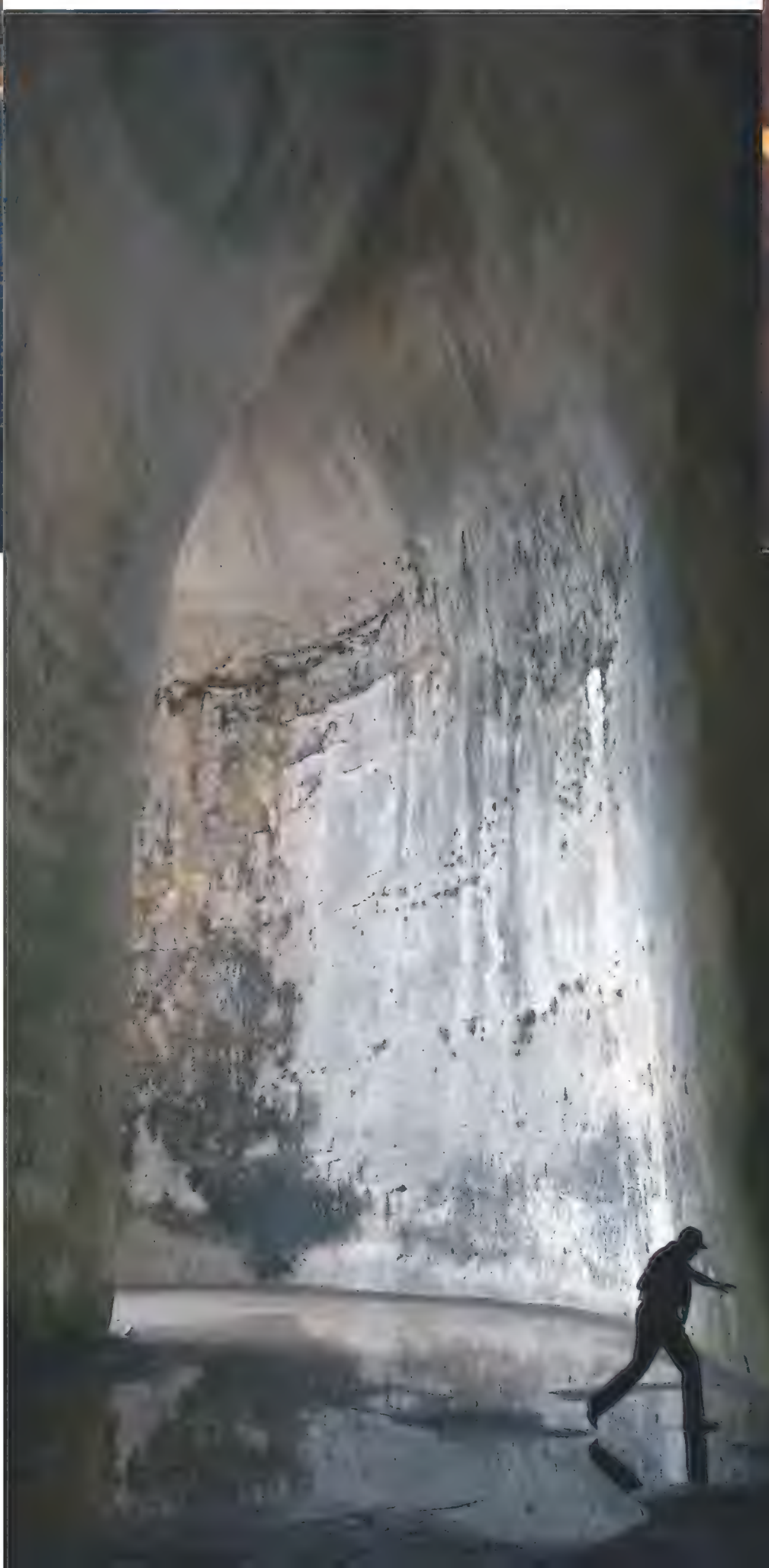
In Syracuse, Caravaggio was reunited with Mario Minniti, a close friend and fellow artist with whom he had lived in Rome. Minniti is thought to have helped arrange Caravaggio's commission to paint a monumental canvas, *The Burial of St. Lucy* (opposite), for the Church of Santa Lucia, where the virgin martyr had originally been entombed. When not traveling, the painting is now in the Museo Regionale di Arte e Moderna, housed in the Palazzo Bellomo on Ortygia.

As in *The Beheading of St. John the Baptist*, the narrative is confined to the lower half of the canvas, where the burial is taking place. Long before you see the martyred saint, your eye is caught by two gravediggers, one of whom has his back turned toward you. And you must look past them to see the

DARRIN ZAMMIT LUPI / REUTERS / CORBIS; P. 91 TOP RIGHT: SCALA / ART RESOURCE, NY

murdered virgin, who is surrounded by a small circle of mourners, a grouping that helps make the painting a resonant depiction of grief and loss.

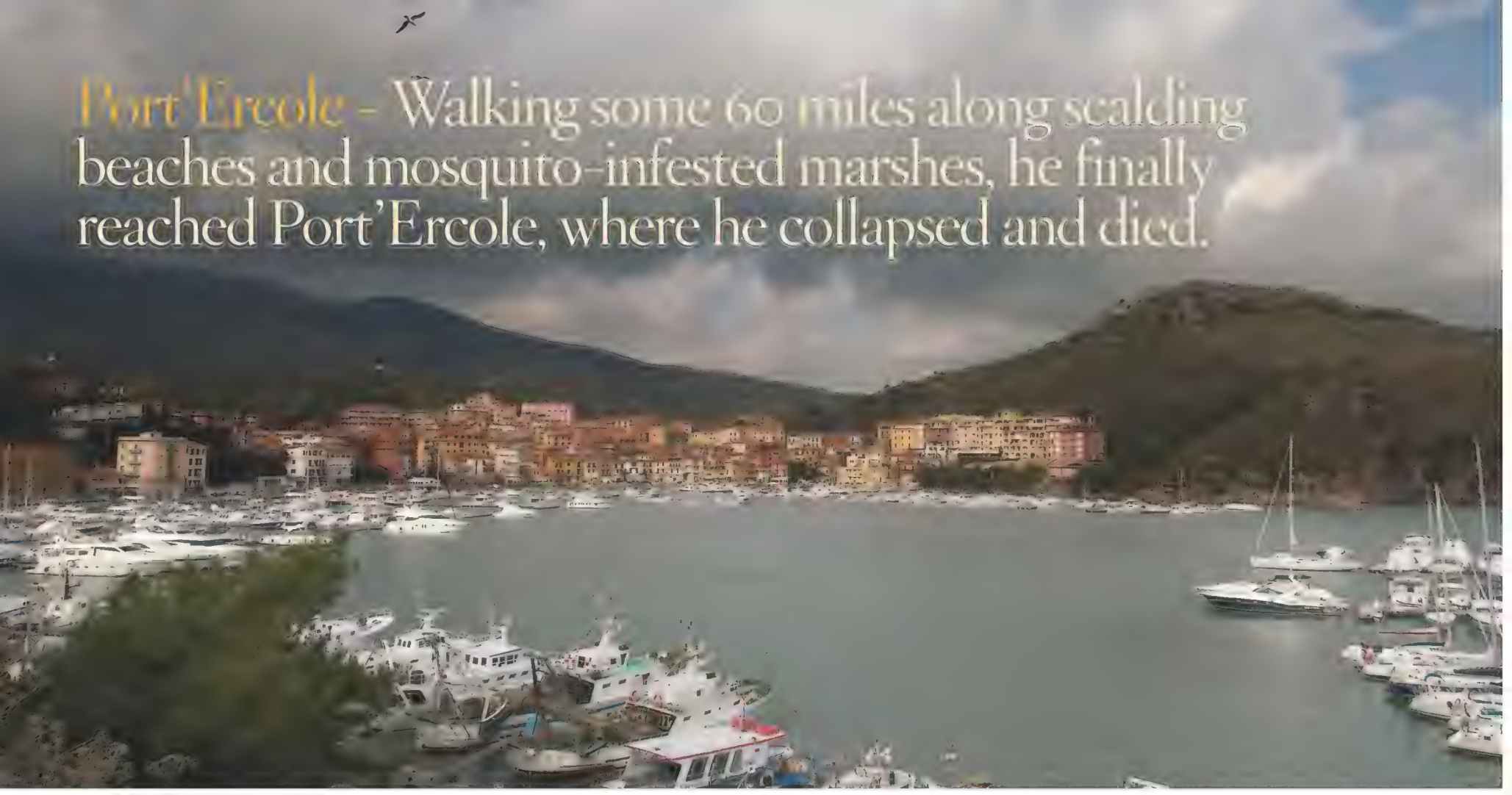
In the winter of 1608-9, Caravaggio left Syracuse for Messina, where he received a commission to paint *The Resurrection of Lazarus*. According to one early biographer, he destroyed the first version of the painting when he felt that it had been underappreciated by his provincial patrons. Later he repainted it, presumably using a corpse as the model for the dead Lazarus, just as he had for the first version. Little about the modern city, with its broad, straight avenues and new construction, evokes Caravaggio's Messi-



Caravaggio arrived in Syracuse, Sicily, in 1608. While visiting one of the city's ancient stone quarries (left), noted for its remarkable echo and thought to have been used as a prison by fourth-century B.C. despot Dionysius I, the artist dubbed it the Ear of Dionysius. He completed *The Burial of St. Lucy* (above), for the Church of Santa Lucia, before leaving for Messina in the winter of 1608-9.

na, most of which was leveled by an earthquake in 1908. And the two Caravaggios, including *The Resurrection of Lazarus*, in the city's art museum are not among his finest.

After a fight with a local schoolmaster who claimed that the artist stared too fixedly at young schoolboys, Caravaggio left Messina for Palermo. In contrast to Messina, there is plenty to see in Palermo, Sicily's astonishingly lively and culturally rich capital city—but not, as it happens, a Caravaggio; *The Adoration of the Shepherds with Sts. Lawrence and Francis* that he painted there was later lost. Even so, a week is hardly enough to visit Palermo's vibrant markets (most famously, the Vucciria), to stroll through its historic districts, to step inside its Baroque churches, to see its magnificent mosaics and to seek refuge from the city's hubbub


Port'Ercole - Walking some 60 miles along scalding beaches and mosquito-infested marshes, he finally reached Port'Ercole, where he collapsed and died.

Desperate to recover his possessions and paintings still onboard the ship that had left him behind in the port of Palo, Caravaggio pursued the vessel to its final destination of Port'Ercole (above). *St. John the Baptist Drinking at the Fountain* (below) may have been one of the works he sought.

in the cloistered garden of San Giovanni degli Eremiti.

From Palermo, Caravaggio returned to Naples, where, during a fight at a tavern, his face was so badly slashed that he was nearly unrecognizable. While he recovered he began a series of smaller paintings for the powerful Romans pleading his case. And eventually, in the summer of 1610, he received word that those wealthy patrons had at last succeeded in obtaining an official pardon from the pope for the 1606 murder.

Bringing along several paintings, he set sail for Rome. But en route, he met with bad luck, and then disaster. At the tiny Tuscan port of Palo, northwest of Rome, Caravaggio disembarked. Possibly mistaken for someone else, he was held for questioning. The tide turned, and the ship, with all of his possessions and paintings, sailed on without him to its destination of Port'Ercole.

Two days later, after buying his way out of prison, he was released. Left with little funds, furious and desperate to recover his paintings, he resolved to catch up with the ship. Traversing marshy, mosquito-infested areas and walking more than 60 miles along the scalding beach, he finally reached Port'Ercole, where he collapsed and died, most likely of fever, in a small infirmary run by the brothers of San Sebastiano. He was 38.

PORT'ERCOLE

By this point, the Caravaggio pilgrim may be forgiven for not dwelling on the fact that Port'Ercole was, for his or her hero, a place of suffering and death. Because almost 400 years later, it's become a lovely resort on the Tuscan coast, with a crescent-shaped harbor surrounded by hilltops with a fort and a tower. It's a town where Italians go to eat fresh seafood, and shop and stroll along the promenade fronting the ocean. And from Port'Ercole, you can drive through the saltwater marshes to the equally pleasant town of Porto Santo Stefano.

The once-lonely, rugged outpost where Caravaggio died seems a long way from its current incarnation as a haven of relaxation and pleasure. And yet when you mention Caravaggio's name to Port'Ercole's residents, a certain expression comes over their faces, a look of pride in their hometown's connection, however tragic, with this important artist. To discuss Caravaggio's sad fate with the citizens of Port'Ercole is to acknowledge that you came here for something more than the scampi, the sea and the sun. You feel as you might if you'd checked into Chaucer's Tabard Inn, or perhaps a hostel along the pilgrimage route to Santiago de Compostela. That is, you can't help imagining that your hosts view you as part of a long procession, a line of pilgrims that have come before you, and that, thanks to the power of Caravaggio's art, will keep coming—for years, even centuries, after you have gone.

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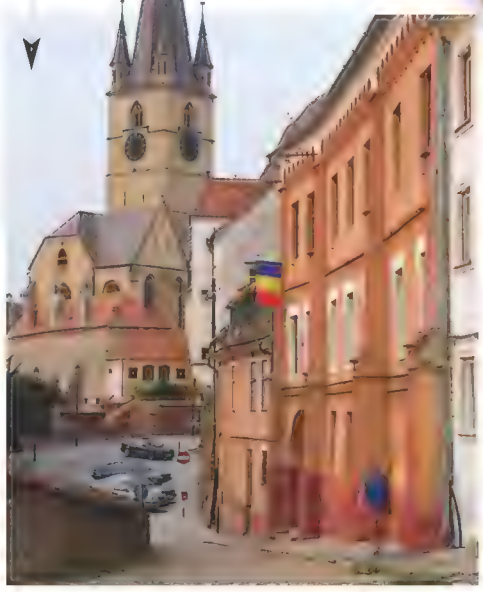
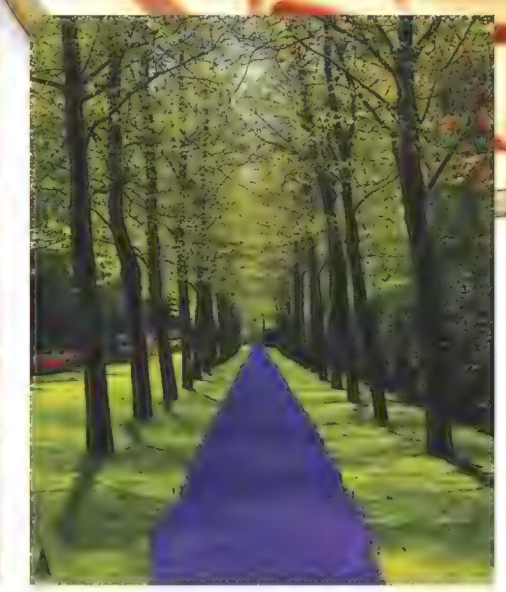
Highlights & Hotspots

BRUGES, BELGIUM In Belgium, chocolate is an art. No, really. At the Chocolate Festival (April 6 through 10), master chocolatiers whip up not only plenty of sweets but also chocolate sculptures and paintings. Connoisseurs can dip into history at the city's Chocolate Museum.

VALENCIA, SPAIN Yachts set sail June 23 for the 156-year-old America's Cup (named after the original winning boat, not the USA). Seasick? Check out the architecture, including native son Santiago Calatrava's futuristic City of Arts and Sciences.

SIBIU, ROMANIA Throughout 2007, coinciding with Romania's induction this past January into the European Union, medieval Sibiu is offering special concerts, films, art exhibits and other facets of life in Transylvania (except Dracula's Castle, 96 miles away near Brasov).





LISSE, THE NETHERLANDS From March 22 to May 20, the 80-acre Keukenhof Gardens opens to the public. Seven million tulips, hyacinths, daffodils and crocuses are planted in the soil in different layers to ensure that the grounds are abloom all season.

VENICE, ITALY The 52nd Biennale di Venezia arts festival floods the city from June 10 to November 21. Drawing artists from all over (French painter Bernard Frize's *Néoha*, detail, shown in 2005), the exhibition defines art's leading edge—at least until 2009.

MORGAN HOWARTH / IPN; FERNANDO BUSTAMANTE / ASSOCIATED PRESS; JON ARNOLD / DANITA DELIMONT STOCK PHOTOGRAPHY; ALAMY; FONDAZIONE LA BIENNALE DI VENEZIA; MARK BAKER / ASSOCIATED PRESS; CYRIL RUOSO / MINDEN PICTURES

FRANCE An international sport since 1871, rugby is still played with little padding. This year, France hosts the quadrennial Rugby World Cup from September 7 to October 20. Twenty national teams will compete in 48 matches to determine which country has the hardest heads.

{ BY AMY CRAWFORD }

WESTMAN ISLANDS, ICELAND One of the world's largest colonies of puffins lives here. In August, chartered boats take "clown of the sea" fans around Heimaey (pop. 4,300) to witness millions of pufflings emerge from cliff-side burrows and head out to sea for the first time.

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PRESENCE OF MIND

Next Stop, Squalor

Is poverty tourism—"poorism," they call it—exploration or exploitation? **BY JOHN LANCASTER**

THE DHARAVI SQUATTER settlement in Mumbai is often described as the biggest slum in Asia. It sits between two rail lines in the northern part of the city, on a creek that once sustained a thriving fishery. The creek is now a sump of sewage and industrial waste, and the air above Dharavi is foul.

By one estimate, the slum is home to 10,000 small factories, almost all of them illegal and unregulated. The factories provide sustenance of a sort to the million or so people who are thought to live in Dharavi, which at 432 acres is barely half the size of New York City's Central Park. There is no discernible garbage pickup, and only one toilet for every 1,440 people. It is a vision of urban hell.

It is also one of India's newest tourist attractions. Since January of last year, a young British entrepreneur, Christopher Way, and his Indian business partner, Krishna Poojari, have been selling walking tours of Dharavi as if it were Jerusalem's walled city or the byways of Dickens' London. There seems to be a market for this sort of thing: almost every day during the recent December holidays, small groups of foreign travelers, accompanied by Poojari or another guide, tramped through Dharavi's fetid alleys in a stoic quest for . . . What? Enlightenment? Authenticity? The three-hour excursions are slated for mention in a forthcoming *Lonely Planet* guide, and they cost

Water runs through Dharavi's pipes (above), but often its estimated one million residents get theirs from dubious sources.

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about $6.75 a head—more if you want to go to Dharavi by air-conditioned car.

Poverty tourism—sometimes known as "poorism"—did not originate in Mumbai (formerly Bombay). For years, tour operators have been escorting foreign visitors through Rio de Janeiro's infamous *favelas*, with their drug gangs and ocean views, and the vast townships outside Cape Town and Johannesburg, where tourists are invited to mix with South Africans at one of the illicit beer halls known as shebeens. A nonprofit group in New Delhi charges tourists for guided walks through the railway station, to raise money for the street children who haunt its platforms.

But the Dharavi tours have been especially controversial. In a lengthy report last September, the Indian English-language *Times Now* television channel attacked them as an exercise in voyeurism and a sleazy bid to "cash in on the 'poor-India' image." That report was followed by a panel discussion in which the moderator all but accused Poojari of crimes against humanity. "If you were living in Dharavi, in that slum, would you like a foreign tourist coming and walking all over you?" he sputtered. "This kind of slum tourism, it is a clear invasion of somebody's privacy. . . . You are treating humans like animals." A tourism official on the panel called the tour operators "parasites [who] need to be investigated and put behind bars," and a state lawmaker has threatened to shut them down.

The critics, it seemed, had claimed the moral high ground. But could they hold it?

ONE SUNNY MORNING this past December, I met Christopher Way at Leopold's Café, a popular backpackers' hangout in Mumbai's bustling Colaba district. At 31, he is boyish and bespectacled, with a thatch of tousled brown hair and a thoughtful, unassuming manner. Over glasses of freshly squeezed mango juice, he told me that he grew up near Birmingham, England, and after graduation from Birmingham University, set off on a path to become

A tourism official said the operators were "parasites" who should be "put behind bars," and a state lawmaker has threatened to shut them down.

a chartered accountant. But Way was afflicted with chronic wanderlust. In 2002, he visited Mumbai and liked the city so much that he stayed five months, volunteering as an English teacher and cricket coach in a local elementary school. He subsequently took an extended holiday in Rio, where he signed up for one of the favela tours. Although frustrated by the guide's lack of knowledge about the shantytown, Way says he found the experience fascinating. It occurred to him that he might be able to do something similar in Mumbai.

As many as half of that city's 18 million or so residents live in squatter settlements, so there was no shortage of potential venues. But Dharavi, as the largest and most established of Mumbai's slums, was the obvious choice. Way's idea was to showcase the settlement's economic underpinnings in a way that would challenge stereotypes about the poor. "We're trying to dispel the myth that people there sit around doing nothing, that they're criminals," he said after we had walked across the street to his office, a grubby, windowless space barely big enough for his desk and laptop computer. "We show it for what it is—a place where people are working hard, struggling to make a living and doing it in an honest way."

To smooth things out with local bureaucrats and Dharavi residents, Way needed an Indian partner, and he found one in Poojari, now 26, a farmer's son who had migrated to Mumbai as an unaccompanied 12 year old and put him-

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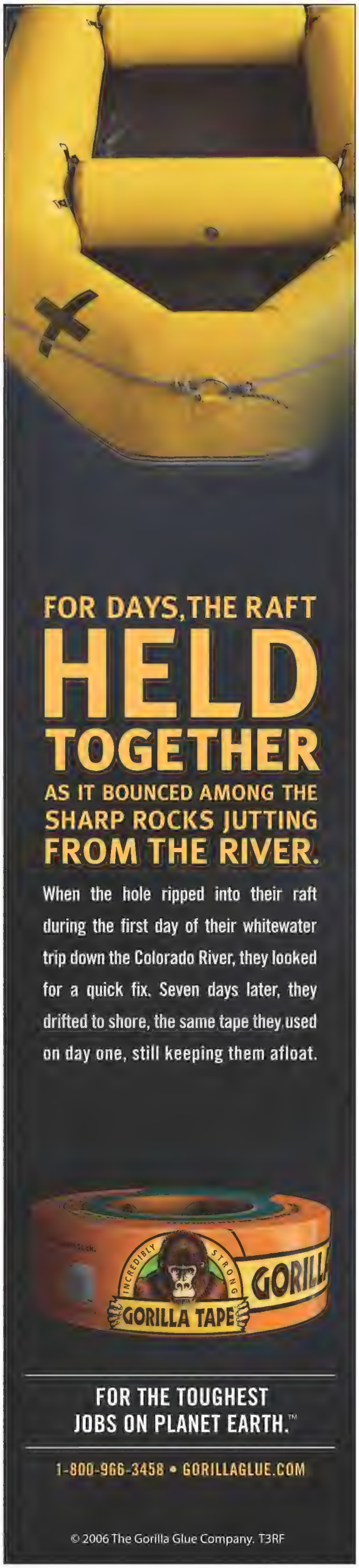
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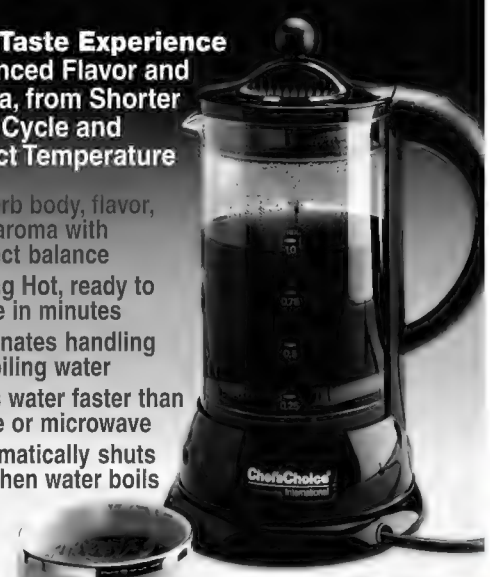

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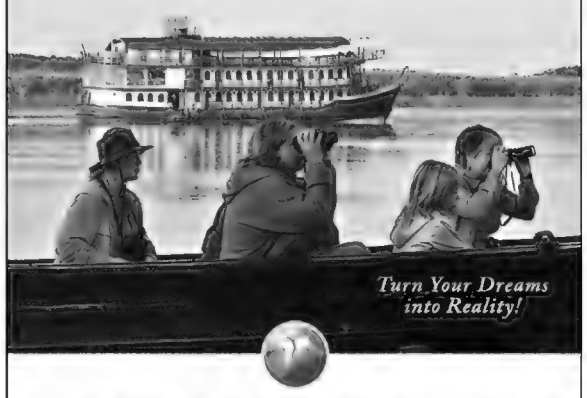

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self through night school by working in an office cafeteria. The two men formed a company, Reality Tours & Travel, and bought a pair of air-conditioned SUVs. Way bankrolled the venture with income from rental properties he owns in England. Besides the Dharavi tours—which can be combined with visits to Mumbai's red-light district and Dhobi Ghat, a vast open-air laundry—the company offers sightseeing of a more conventional nature, along with hotel bookings and airport transportation. Way has pledged that once the company starts making a profit, it will donate 80 percent of its slum-tour earnings to a charitable group that works in Dharavi. "I didn't want to make money from the slum tours," he says. "It wouldn't have felt right."

Except on its Web site (realitytours andtravel.com) and a sign on a lamppost near Leopold's Café—"See Dharavi (the biggest slum in Asia)"—the company does not advertise the slum excursions. But as word has spread over the Internet and by other means, business has grown steadily, drawing visitors from around the world.

Late one morning I met Poojari at the Churchgate railway station, where we hopped on a dilapidated commuter train for the 25-minute ride to Dharavi. Waiting for us there was tourist Jeff Ellingson, a 29-year-old technology professional from Seattle. Before we got started, Poojari explained that the company has a no-photography policy, to keep the tours from becoming too intrusive. (For the same reason, each group is limited to five people.) Then we took a pedestrian bridge over the railroad tracks.

Dharavi stretched before us like a vast junkyard, a hodgepodge of brick and concrete tenements roofed with corrugated metal sheets that gleamed dully in the sunshine. Poojari gave us a moment to take it all in. "We'll show you the positive side of a slum," he declared.

In the face of such squalor, his words seemed jarring. But Dharavi's industriousness is well documented. Its businesses manufacture a variety of

P. 101 SEBASTIAN D'SOUZA / AFP / GETTY IMAGES

products—plastics, pottery, bluejeans, leather goods—and generate an estimated $665 million in annual revenue. In other words, Dharavi is not just a slum, it is also a node on the global economy.

DHARAVI'S INDUSTRIES are arranged geographically, like medieval guilds, and the first alley we visited belonged to recyclers. In one small "godown" (as warehouses are known on the subcontinent), men were disassembling old computer keyboards. In another, men smeared from head to toe in blue ink stripped the casings from used ballpoint pens so they could be melted down and recycled. A few doors down, workers used heavy chains to knock the residue from steel drums that had once contained polyester resin. Poojari told us that some of Dharavi's empty plastic bottles come from as far away as the United Kingdom. "People from a rich family, when they drink from a plastic bottle, they don't know what happens to it afterwards," he said. "Here, you see."

"We show it for what it is—a place where people are working hard," said one of the Dharavi tour operators. In the potters' quarter, women put the final touches on urns.

Few of the recyclers wore gloves or other protective gear, despite exposure to solvents and other chemicals that caused my eyes and throat to burn after just a few minutes. The working conditions were typical of Dharavi's unregulated businesses. Some of the worst were in the foundries. From the door of one dark, unventilated space, I watched a heavyset worker dressed in a sarong ladle molten steel into a belt-buckle mold that he held between his feet. His *bare* feet. After cracking open

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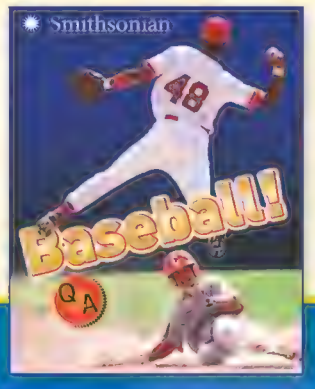

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I watched as a heavyset worker dressed in a sarong ladled molten steel into a belt-buckle mold that he held between his feet. His *bare* feet.

the mold to reveal the glowing red buckle in its bed of sand, he glanced up, and for a moment our eyes met. His face was wooden, expressionless. I mumbled thanks and moved on.

Not for the first time on the tour, I felt like an interloper, and I wondered how the slum workers and their families felt about white-skinned strangers who showed up to gawk from the threshold. For Dharavi was undeniably grim. As we neared its center, the alleys narrowed and cantilevered balconies closed out the sun, casting everything in a permanent gloom. Children played next to gutters that flowed with human waste, and hollow-eyed men bent nearly double under the weight of burlap-covered loads. But if the people of Dharavi resented us, they kept it to themselves. Some even seemed happy to take part in our education. "Here, everybody is working," a man said genially, and in perfect English, as we paused outside the yogurt-cup recycling operation where he sat sipping tea with the owner.

The welcoming reception probably had something to do with the tour operators, who have cultivated good relations with the slum workers as well as local police. There are, moreover, certain rules. From the door of a one-room garment factory, I spotted a boy who looked to be no more than 8 sitting with other workers at a long table, where he was embroidering fabric with fine gold thread. I nudged my guide: "Ask him how old he is." Poojari shook his head no.

Students are a common sight on the tour, but child laborers are not; laws limit the employment of those under 14.

Pointed questions were not part of his compact with the slum dwellers.

As it happens, Ellingson and I did not see many child laborers in Dharavi, perhaps because of laws limiting employment of children under 14 or, more likely—as Way suggested later—because they were sequestered out of view. We did see several schools, however, and plenty of kids in uniforms. "By plane you are coming?" one boy asked in English, before declaring, with evident pride, "I'm studying in 8th standard."

Blighted though it was, Dharavi had the feeling of an established community. Signs in Hindi advertised the services of doctors and dentists. An outdoor barber administered a shave with a folding razor. A laundryman stood against an alley wall, pressing clothes with an ancient-looking iron. At a small factory where recycled plastic was melted down and turned into tiny pellets for use by toymakers, the owner, who was in his late 20s, told us that his father had started the business three decades ago. Like many of the slum dwellers, the factory owner was a Muslim, although Dharavi is nothing if not diverse. Its residents come from all over India, and many have lived there for a generation or more. Poojari said that one of the slum neighborhoods is dominated by the descendants of potters from Gujarat state who settled in Dharavi in 1933. When

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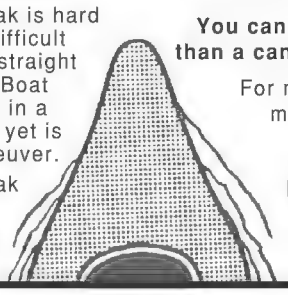
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Almost no one asked for money—which was a big change from the main tourist district—and nobody tried to sell me anything.

we visited the potters' district in the early afternoon, we were puzzled to find few signs of life, other than smoking kilns and an old man napping on a rope cot. It turned out that most of the potters and their families had taken the afternoon off to attend a wedding.

Ellingson drew a comparison with Palestinian communities he had toured in the West Bank. They were "a lot wealthier, but it's like society has broken down," he said, adding that in Dharavi, "it feels like something is functioning." I had to agree.

For one thing, almost no one asked for money, or even tried to sell me anything. Only once was I approached for a handout, by an elderly woman. That was a big change from Colaba, the main tourist district, where it is difficult to walk more than a few steps without being accosted by a beggar—usually a young woman with an infant on her hip—or a peddler hawking laminated maps. Perhaps people in Dharavi were simply too busy. And some of them clearly had rupees in their pockets. Besides the food stalls and handcarts piled high with okra and squash, there were video parlors showing Bollywood hits, several bars and, on one thoroughfare, a spiffy-looking electronics store plastered with Sony decals.

"They're happy to be here," Poojari said as we paused outside a small factory where women were stitching bluejeans. "They don't want to move out of Dharavi." I don't know about "happy," but on the latter point, Poojari was probably correct.

Because of its prime location—on rail lines near the heart of one of the world's most crowded cities—Dharavi sits on valuable real estate, and its residents are not about to give up their stake. The slum is the focus of a looming showdown with municipal authorities and developers who want to turn it into office towers, luxury apartments and shopping centers. Families that can prove they have lived in Dharavi since 1995 would be entitled to a free apartment in the same area, but the new dwellings would be so small—just 225 square feet—that many prefer to stay where they are. Nor is it clear what would happen to the thousands of businesses that provide Dharavi residents with jobs.

We finished the tour on the side of a busy four-lane road, where the festive sounds of a Hindu wedding ceremony—apparently the one the potters had gone to—spilled from a gaudy tent. We paused to peek inside, and I spotted the groom sitting awkwardly beneath an enormous gold turban. No one gave us a second glance, and I had to wonder about the motives of those in the Indian media and elsewhere who claimed on behalf of the Dharavi residents to be offended by the tours. Surely their ire could have been better targeted at the municipal authorities who had failed to provide the community with basic sanitation. I wondered whether the critics weren't simply embarrassed by the slum's glaring poverty—an image at odds with the country's efforts to rebrand itself as a big software park. In any case, it seemed to me that the purpose of the tour was not to generate pity, but understanding. That's not to say that it made me an expert—I was only there a few hours, after all. Were the people I saw in Dharavi the victims of globalization, or its beneficiaries? I still don't know. But at least the question had been raised in my mind.

JOHN LANCASTER *recently completed a four-year assignment as the South Asia correspondent for the* Washington Post.

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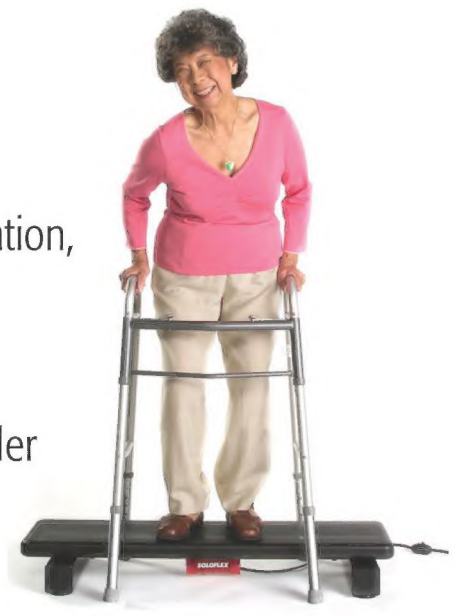
Regardless of age, anyone who isn't lifting weights regularly should consider this alternative. Start with ten minutes a day.



Great for all ages!

90-day money back guarantee

SOLOFLEX® WBV

The Machine that Exercises You!™

Learn more about Whole Body Vibration at **www.soloflex.com** or call **1-800-547-8802**

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Lowest price ever...$49.95!

A floor lamp that spreads sunshine all over a room–and pays for itself!

CALL TODAY TO RECEIVE FREE SHIPPING*

*The Balanced Spectrum® floor lamp combines the benefits of natural daylight indoors with a savings of $77 over the life of one bulb!***

Ever since the first humans built a fire in their dark cave, people have realized the importance of proper indoor lighting. But ever since Edison invented the light bulb, lighting technology has, unfortunately, remained relatively prehistoric.

Modern light fixtures do little to overcome problems associated with improper lighting, such as eyestrain, dryness, and burning. As more and more of us spend longer and longer hours in front of our computer monitor, these problems are compounded. And the effects of improper indoor lighting are not necessarily limited to physical problem: the quantity and quality of light can also play a part in both our mood and work performance.

New longer life bulb now SAVES $77 over the life of one Balanced Spectrum® bulb!*

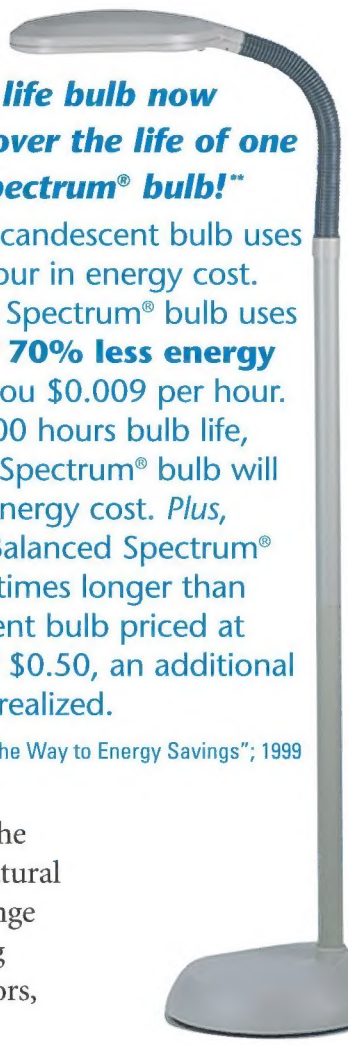
A 150-watt incandescent bulb uses $0.013 per hour in energy cost. The Balanced Spectrum® bulb uses an average of **70% less energy** which saves you $0.009 per hour. Based on 8,000 hours bulb life, the Balanced Spectrum® bulb will save **$72** in energy cost. *Plus,* because the Balanced Spectrum® bulb lasts 10 times longer than an incandescent bulb priced at an average of $0.50, an additional **$5** savings is realized.

**Source: "Lighting the Way to Energy Savings"; 1999

Studies show that sunshine can both lift your mood and enhance your energy levels. But as we all know, the sun does not always shine. Now, however, there's a solution to the problem–a way to bring the positive benefits associated with natural daylight indoors. The **Balanced Spectrum® floor lamp** will change not only the way you see, but the way you feel about your living and work spaces. It brings the benefits of natural daylight indoors, simulating the full spectrum of daylight.

The **Balanced Spectrum's** 27-watt compact bulb is the equivalent of a 150-watt ordinary light bulb. With the lamp's sharp visibility, you will see with more clarity and enjoyment in close tasks such as reading, writing, sewing, and needlepoint. It is especially helpful for aging eyes.

Experience sunshine indoors at the touch of a switch. This amazing lamp is not only easy on the eyes, it is easy on the hands as well, featuring a special "soft-touch, flicker free" rocker switch that is easier to use than tradition toggle or twist switches. And its flexible gooseneck design enables you to get light exactly where you need it. The high-tech electronics, the user-friendly design, and bulb that lasts 10 times longer than an ordinary bulb–all these feature make the **Balanced Spectrum® floor lamp** a must-have.



Height as shown: 50"

"As soon as I turned on the lamp and began to read the newspaper I could see the wonderful difference. This lamp is just what I needed. Thank you so much."

Donna E.
Scranton, PA

Try the Balanced Spectrum® floor lamp for the best value ever! Now more than ever is the time to add sunshine to every room in your home at this fantastic low price! The Balanced Spectrum® floor lamp comes with *first*STREET's exclusive guarantee. Try this lamp for 90 days and return it for the product purchase price if not completely satisfied.

Balanced Spectrum® floor lamp

Item# BB-3589 ..... was ~~$59.95~~

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MANY THOUSANDS OF YEARS AGO, when man first walked the Earth, it was very useful for him to understand the differences between the minerals that nature offered. There were hard materials from which he fashioned his tools and hunting weapons. And others, which were softer, could be ground to make pigments and he used those for his cave paintings.

Thousands of years later, less common minerals were sought after for making decorative items like jewelry as was the case with gold and silver.

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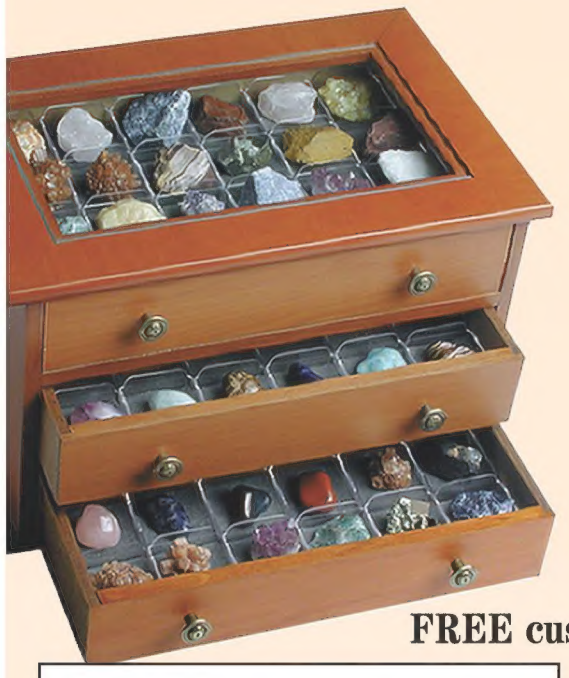

Collected for you by experts

Minerals of the Earth have been collected from important geological sites on five continents. Delicately colored Rose Quartz found in Brazil and Madagascar. Clusters of Amethyst crystals (geodes) from Uruguay. Iron Pyrites, with their metallic luster, from Europe. Each specimen hand picked for your collection.

Each specimen comes with a colorful fact sheet containing scientific data about its formation, origins and uses. *To house these fact sheets, an attractive binder is provided free for subscribers.*

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Calcite crystals are bi-reflective (light is reflected in two different directions) giving semi-translucent sheen with sparkling reflections. Found worldwide.

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Sharp, dark blue, crystalline mineral found in copper ore deposits in North and Central Africa.

OF THE EARTH

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Lads Without Plaids

Kiltless in Scotland: An Action Plan **BY BRUCE MCCALL**

Military officials said that Scottish soldiers were having to share their ceremonial kilts because defense chiefs had not finalized a contract to buy enough kilts to go around. At last count, there were just 320 kilts for 5,000 soldiers.
—The New York Times, *December 19, 2006*

To: Office of the Quartermaster General
From: Sergeant Major, Scottish Regimental Stores
Re: Kilts, tartan, ceremonial

EYES ONLY

1. Due to Her Majesty's Army Auxiliary Budget Item A-06-7895 being still in Committee, approximately 4,680 Scottish Regimental officers, NCOs and men have not been issued their regulation ceremonial kilts. Whereas,

2. Upcoming kilted Army operations are:
a) Haggis Festival opening, Edinburgh, March
b) Robbie Burns festivities, Dumferline, April
c) Anniversary of H.M. Queen Victoria's 1895 Marmalade Judging Contest, Balmoral Castle, May.

Summary: The Army will begin said operations undermanned and/or underdressed.

Permanent solution: Immediate delivery of 4,680 regulation tartan-pattern Army kilts. Sergeant Major, Scottish Regimental Stores, informed that this is not on (see above). Requested Action Programme follows.

Temporary solutions, UNACCEPTABLE:

1. Confiscate all Scottish Regimental bagpipes, remove bags, hire ladies from sewing circles in villages nearest bases to transform them into kilts.
Obstacle: Likely mutiny by music-loving officers, NCOs and men.

2. Dispatch combined Army-Royal Marine Flying Shopper Squads to purchase required quantity of kilts from theatrical supply houses.
Obstacle: Would not know where said kilts have been.

3. Order 4,680 officers, NCOs and men to "make do" with jodhpurs, sarongs, pajama bottoms, etc. brought from home.
Obstacles: a) Would erode unit cohesiveness
b) Would invite ridicule in newspaper editorials.

4. No kilts.
Obstacles: a) Violation of Army Dress Code Regulations B-544 through C-711
b) Risk of chilblains, pleurisy, etc. among underdressed soldiers
c) Would explode ancient mystery of what a Scotsman wears under his kilt.

Temporary solutions, ACCEPTABLE:

1. Dispatch Army-Royal Marine Flying Shopper Squads to finer department stores and dry-goods shops to purchase substitute BATH/BEACH TOWELS, tartan pattern, pinned at upper fold to resemble kilts.
Obstacles: a) Now off-season. BATH/BEACH TOWELS, tartan pattern, unavailable in quantity
b) Suitable pins not included in soldiers' kits.

2. Dispatch Army-Royal Marine Flying Shopper Squads to purchase navy/midnight blue/black woolen MID-CALF SKIRTS from girls' school uniform suppliers.
Obstacle: Available only as part of complete girls' school uniform kit, including pinafore, lisle stockings, oxford shoes sizes 7-11, per individual order @ £165 x 4,680, exceeding Army budget.

3. Have officers, NCOs and men dye and weave own kilts, requisitioning WOOL from sheep pastured within 30-kilometer radius of affected Army barracks.
Obstacle: Sole instruction book, So You Want to Dye Tartans and Plaids (1968), out of print.

Recommendation: Your call. Sir.

RICHARD THOMPSON